



SIERRA LEONE.

Annual Report

OF THE

LANDS AND FORESTS DEPARTMENT

FOR THE YEAR

1926.

FREETOWN :
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SIERRA LEONE

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FROM THE COMMISSIONER OF LANDS AND FORESTS
TO THE HONOURABLE THE COLONIAL SECRETARY, FREETOWN.

SIR,

I have the honour to submit herewith the annual report of this department for the year 1926.

2. The department now comprises the following divisions :—

- (a) HEADQUARTERS—ADMINISTRATIVE
- (b) DIVISION OF RESEARCH
- (c) DIVISION OF AGRICULTURE
- (d) DIVISION OF FORESTS
- (e) DIVISION OF ENTOMOLOGY
- (f) DIVISION OF INSPECTION.

3. The staff of the department at the end of the year was as follows :—

HEADQUARTERS—ADMINISTRATIVE.

Head of Department :

Commissioner of Lands and Forests M. T. Dawe, O.B.E.,
assisted by one head clerk, nine clerks and a keeper of the economic collection.

DIVISION OF RESEARCH.

Agricultural Chemist	...	...	...	Dr. F. J. Martin
Assistant Agricultural Chemist	...	...	...	H. C. Doyne
Mycologist	...	...	...	F. C. Deighton
African Laboratory Assistants	...	...	...	Three

DIVISION OF AGRICULTURE.

Director of Agriculture	...	...	...	D. W. Scotland
Agricultural Instructor	...	...	...	D. C. Edwards
Provincial Superintendent of Agriculture	...	...	...	J. W. D. Fisher
" " "	...	...	...	R. R. Glanville
" " "	...	...	...	E. I. Nisbett
" " "	...	...	...	J. V. R. Brown
" " "	...	...	...	P. J. Moss
African Agricultural Assistants	...	...	...	Ten
Clerks	...	...	...	Six

DIVISION OF FORESTS.

Conservator of Forests	...	...	...	K. G. Burbridge
Senior Assistant Conservator of Forests	...	...	...	E. Macdonald
Assistant Conservator of Forests	...	...	...	D. G. Thomas
" " "	...	...	...	A. Burns
" " "	...	...	...	J. C. Mallam
Rangers, First Class	...	...	...	Four
Rangers, Second Class	...	...	...	Nine
Foresters	...	...	...	Ten
Forest Guards	...	...	...	Fifty-nine
Nurserymen	...	...	...	Nine

DIVISION OF ENTOMOLOGY.

Entomologist	...	...	...	E. Hargreaves
African Laboratory Assistant	...	...	...	One

DIVISION OF INSPECTION.

Inspector of Plants and Produce	...	...	G. Tuach
Sub-Inspectors of Produce	...	...	Four

HEADQUARTERS—ADMINISTRATIVE.

3. The Commissioner made a protracted tour of the Kono country in March, being absent from Freetown from the 1st to the 23rd. A visit was made to Moyamba to investigate the campaign for peeled ginger and also to Sembehun to inspect swamp rice cultivation. At Pujehun a consultation with the Provincial Commissioner was held in agricultural activities in the Southern Province. Trading centres at Blama, Kenema and Boagibu were visited and the forest station at Johama was inspected. A further inspection of the Mabang Oil-palm Plantation was made and the cotton experiment farm at Kainkordu was visited.

On the 10th April the Commissioner was appointed Exhibition Commissioner for the Sierra Leone Section at the Canadian National Exhibition at Toronto and proceeded to England on leave on the 12th May to make preparations for the Exhibition. The Conservator of Forests was in charge of the department from the 12th May to the end of the year.

IMPERIAL INSTITUTE.

4. During the year the department again received valuable assistance from the Imperial Institute in connexion with various samples of produce which were forwarded for investigation and enquiry. The department submitted, *inter alia*, samples of copra, piassava, ginger and ginger peelings, and the following is a summary of the reports received from the Imperial Institute:—

5. *Copra*.—The samples submitted for investigation, which had been prepared in the Southern Province, weighed $2\frac{1}{2}$ lb. and consisted of small pieces of copra in good sound condition, the inner surface being of pale brown colour. The results of the examination showed that the copra contained a good percentage of oil, although the amount was slightly less than in the best commercial grades. The extracted oil was of the usual appearance and the percentage of free fatty acids was satisfactorily low. The percentage of moisture was a little too high, being 4 per cent., whereas the maximum desirable was not more than 3 per cent.

The copra was submitted to oil seed crushers and brokers. The former stated that the percentage of oil present was about one per cent. less than that of Ceylon copra and about two per cent. less than West Indian.

It is desirable that in the preparation of consignments of copra for export the moisture should be reduced to at least 3 per cent. in order to minimize the risk of mould developing during storage and transit, with a consequent increase in the acidity of the oil.

6. *Piassava*.—In connexion with the efforts which are being made by the Lands and Forests Department to improve the methods of preparing and grading piassava, forty-six samples prepared experimentally by the Agricultural Chemist, were forwarded for examination and report. The samples had been obtained from two different species of *Raphia* palms, from both young and old trees, from different parts of the leaf-sheath, and had been retted for varying periods. The results of the investigation indicated that in order to prepare piassava satisfactorily, the leaf stalks must be retted for at least three months, and in some cases for an even longer period. The results also demonstrated the fact that the fibre obtained from the two different varieties of *Raphia*, viz. *R. Gaertneri* (Kale) and *R. Vinifera* (Nduvei) is much the same, provided each variety is well cleaned.

7. *Ginger*.—A sample of Sierra Leone peeled ginger (Grade A) was submitted to the Imperial Institute for comparison with Jamaica ginger, in order to confirm or otherwise a statement made by a Canadian manufacturer (to whom samples of ginger were submitted by the Commissioner for Sierra Leone at the Canadian National Exhibition) that Sierra Leone ginger yielded less extract than the Jamaica product. The investigations showed that the sample of peeled ginger from Sierra Leone yielded as much extract as the commercial sample of Jamaica ginger of average quality with which it was compared.

A sample of peeled ginger was also forwarded for comparison with the usual unpeeled product. The ginger had been well prepared and was of good quality. Merchants who were consulted stated that shipments of such material would be readily saleable in England at prices considerably above that of ordinary Sierra Leone ginger. It was suggested that if the ginger were limed and freed from the smaller pieces, it would more closely resemble "cut" Cochin ginger and would realize a still higher price.

At the suggestion of the Imperial Institute a quantity of ginger peelings was also forwarded in order that the yields of essential oil and extract might be determined. The results were very satisfactory and the material would probably find a good opening in England, but the Imperial Institute stated that trials on an industrial scale would be necessary before it was possible to report definitely. A small consignment was therefore shipped to the Imperial Institute and sold to manufacturers for practical tests.

IMPERIAL BUREAU OF MYCOLOGY.

8. The above Bureau was consulted with regard to the identification of various diseases and their preventative and remedial measures. The Bureau has been of considerable assistance to the newly appointed Mycologist.

IMPERIAL BUREAU OF ENTOMOLOGY.

9. A large number of insects were forwarded to the above Bureau for identification. The co-operation of the Bureau of Entomology with the Entomologist has been of great benefit to the Colony.

Kew.

10. A considerable number of botanical specimens were collected and forwarded to the Royal Botanic Gardens, Kew, for determination. We are very grateful to the Director and his staff for the willing and valuable assistance given, not only in naming specimens, but in other ways.

11. *Herbarium*.—The department is more than grateful for the kind assistance rendered in botanical work by Miss B. Newton for a part of the year as Honorary Botanist. Her willing and valuable services were of great help to us and were very much appreciated.

12. *Departmental Museum*.—The museum has been rearranged, and there is no doubt that it is appreciated by the number of people who have visited it.

DIVISION OF RESEARCH.

13. The report of the Agricultural Chemist forms section I of part II of this report and that of the Mycologist section II.

CHEMICAL SECTION.

14. Section I deals with the work carried on in the laboratory.

Soil Survey.—Good progress was made with the soil survey of the country, 625 samples of soil being examined during the year. The results of these investigations are set out in section I. It has been ascertained that all our soils in Sierra Leone are of a lateritic nature, i.e. having a high proportion of alumina to silica. It is hoped that investigations regarding lateritisation of the various types of soil will be completed in 1927.

15. *Oil-palm Investigations*.—A number of samples of palm fruits were analysed during the year, the most interesting of which was a sample of the "mantled" variety (*Elæis guineensis* var. *Poissonii*, A Chev.) which is new to Sierra Leone. This variety has, in addition to the pericarp, a swollen perianth which also yields oil. The data and figures compiled therefrom by the Agricultural Chemist on the Nigerian oil-palm plot at Njala are very interesting.

16. *Copra*.—Investigation and analysis of two types of local coco-nuts were undertaken and the results are briefly given by the Agricultural Chemist.

17. *Adco*.—A source of supply of organic manure is a very important need in Sierra Leone. One of the attempts to solve the problem was a trial with "Adco," which is applied to dry grass or straw for the purpose of decomposing, or breaking down the grass or straw into a form of farm yard manure. The results of these trials are given by the Agricultural Chemist. Further trials must be carried out before any definite decision can be arrived at.

MYCOLOGICAL SECTION.

18. The Division of Research has been augmented by the appointment of a Mycologist, Mr. F. C. Deighton, who arrived in the Colony on the 17th July. As Sierra Leone was a new field for this branch of scientific investigation, a general survey of plant diseases was at first started. It is obvious from the Mycologist's report that a large amount of initial work has been done towards such a survey. The need of a Mycologist in Sierra Leone is very striking when reading his brief report, as it will be seen that nearly every important crop forms a host for one or more fungoid pests. A number of these pests do not at present constitute a serious problem, but the possibility of the pests overcoming certain controlling factors and causing a serious loss of crops to farmers has to be borne in mind.

DIVISION OF ENTOMOLOGY.

19. The Entomologist returned from leave on the 24th April, and his report forms Part III of this report.

20. His trekking was chiefly in connexion with the coco-nut scale pest. There was a serious outbreak of this pest in Sherbro and Turtle Islands, and also at Njala. With the assistance of the red fungus and ladybird beetles, these outbreaks should in time be kept down. There is marked improvement in areas where steps have been taken to establish the fungus and entomophagus insects.

Experiments were carried out on the treatment of the nut of the coco-nut to destroy all scale insects. The results are given by the Entomologist.

A popular pamphlet on this scale pest was issued. Other pests of the coco-nut palm were dealt with.

21. Important investigations have been carried out by the Entomologist on the pests of kola. The figures given by the Entomologist on the pests of the kola nuts harvested at Njala are particularly interesting. This shows the damage done by pests to one of our most important export products. The kola growers suffer heavy losses yearly from serious insect pests. As the Entomologist states, a great deal of work remains to be done on this and other pests of kola.

22. A census was taken by the Provincial Superintendent of Agriculture, Central Province, on the pests of kola trees during his treks. The figures of this census should be carefully considered by all kola growers. Actually 89.9 per cent. of the trees were infested with psyllid and 67.4 per cent. with scale insects. The former pest is a serious cause of loss of fruit.

23. Another pest, the locust (*Zonocerus variegatus* L.), has been dealt with at length and carefully planned investigations and research have been carried out by the Entomologist on combating this pest. The results of his work are very encouraging.

DIVISION OF AGRICULTURE.

24. The report of the Director of Agriculture forms Part IV of this report.

25. *Staff.* The staff of this division was increased by the appointment of Mr. P. J. Moss as Provincial Superintendent of Agriculture. He took up his duties on the 10th April. Owing to home leaves and sickness of certain members of the European staff, there was a marked shortage of staff during a part of the year. However, owing to the energies of a somewhat reduced staff, the various agricultural schemes were pushed forward. The successful progress of these schemes was to a great measure also due to co-operation and assistance of political officers.

Details of the staff are given in the Director of Agriculture's report.

26. The principal agricultural activities were :—

(a) THE OIL-PALM.

The survey of the oil-palm "belts" was continued in connexion with the distribution of varieties and the productivity of each variety has been investigated. Oil-palm demonstration plots have been started. The object of these plots is given by the Director of Agriculture. Nurseries have been started of the hanoi variety with a view to laying out model plots in various chiefdoms. Careful data and records have been kept of the oil-palm plots on the Experimental Farm, Njala. The Nigerian oil-palm plot has become famous throughout Sierra Leone. Many chiefs and people have visited the Experimental Farm for the set purpose of seeing this plot.

(b) SWAMP RICE.

Marked progress was made in the Southern Province in the utilisation of tidal swamp lands for the cultivation of rice. In other districts of the province, the numerous inland swamps have not been forgotten as potential paddy fields. Good progress has been made in this direction, in the Pendembu District especially. Some of the yields from these swamps are given by the Director of Agriculture. The results are so encouraging that the people have become enthusiastic in this form of rice culture.

(c) COCO-NUTS.

The scheme for the encouragement of the planting of coco-nuts in the southern chiefdoms of the Southern Province started in 1923 has been carefully nursed and energetically pursued by political officers and officers of this department. It is estimated that at the close of 1926 there were 191,150 trees planted out under Government supervision. Such a large scheme has only been possible with the hearty co-operation of the Tribal Authorities and their people with the Government, and considerable credit is due to the people.

(d) COCOA.

The cultivation of this crop is spreading particularly in the Mano River and Pujehun districts of the Southern Province. The planting cannot now be controlled by Government and it is impossible to say the number of trees which have been planted. It is known that under Government supervision 308,526 seeds were sown in nurseries and 5,331 seedlings were planted out. The export of cocoa from Freetown and Sherbro was estimated at 41 tons. To a less extent the planting of cocoa in the Pendembu and Kenema districts of the Central Province has also been undertaken. For the first time the cultivation of cocoa was tried in selected chiefdoms on the Bombali District of the Northern Province. It is too early to report on the success of this crop in the area under trial. There were 9,383 cocoa seedlings planted out in seventeen chiefdoms. The plantations on the whole withstood the dry season fairly well.

(e) GINGER.

Active measures were taken in the early part of the year to induce the growers to peel their ginger and produce an "A" Grade quality. It was hoped to ship 100 tons of this quality ginger and the co-operation of the Chamber of Commerce was obtained in this enterprise. It is regrettable that only about 14½ tons of Grade "A" ginger was produced. There were two causes which handicapped our propaganda; firstly the railway strike took place in the midst of the ginger season and secondly the natives considered the price offered was not sufficiently attractive for the extra labour required to produce this better quality ginger. In 1926, however, there was an increase in the export of ginger of approximately 6,000 cwt. over 1925, although the total export value decreased by £47,723. The exported article was chiefly the roughly scraped native ginger. The Director of Agriculture gives the reports of the Imperial Institute on samples of ginger forwarded to the Director.

(f) CASTOR OIL.

In order to increase the area under this crop it was decided to purchase the whole of the 1925 crop of castor beans at 2d. per lb. for redistribution for sowing. The co-operation of the political officers was obtained in this. The area under this crop was considerably increased. The natives were recommended to sow the seed around their towns and villages on the rubbish heaps and waste lands. The scheme met with quite fair success.

(g) MAIZE.

South African varieties were again distributed to applicants. In the Southern Province a considerable area was under this crop.

(h) COTTON.

Owing to the unfavourable reports on Allen Long Staple cotton crop in 1925, the cotton programme was considerably curtailed and the work was chiefly centralized at experimental stations and any applicants who required seed were supplied. The requests came chiefly from the Kono and Pendembu districts. The harvest was a small one, and owing to the local demand for cotton in the manufacture of country cloths the growers were not willing to dispose of their harvest to Government at 2d. or 2½ per lb., consequently, hardly any cotton was raised to the ginnery at Bauya. The ginnery was supplied entirely from the experimental farms. The results of the cotton experiments are given by the Director of Agriculture.

(g) COFFEE.

The cultivation of Robusta coffee was started in the Gbangbama District. Seed was supplied to chiefs and people and nurseries started, and in the Mano River and Pujehun District, east of the Wanje River the cultivation of Liberica was extended.

EXPERIMENTAL FARMS.

27. The most important experimental farm is at Njala, the headquarters of the Division of Agriculture. This is in charge of a European Provincial Superintendent of Agriculture. With the increase in staff of the Provincial Superintendents of Agriculture it was possible to start the farms at Magburaka, Northern Province; Pujehun, Southern Province; and Bedu, Kainkordu and Daru in the Central Province. The Director of Agriculture in his report gives a brief description of the work done at each of these farms. It was most unfortunate that the exceptional flooding of the Taia River in early September caused serious damage to crops and experiments at the Experimental Farm, Njala. However, useful data and information were collected from the numerous plantations and plots not affected by the flood.

28. As Appendix A to the Director of Agriculture's report, the meteorological data for Sierra Leone is attached.

AGRICULTURAL INSTRUCTION.

29. The report of the Agricultural Instructor forms Part V of this report. I submit this in full as agricultural instruction forms an important part in the advancement of agriculture. Satisfactory progress was made and Mr. Edwards is to be commended in his work, especially as his classroom and laboratory is in a mud house with thatched roof. There has been a distinct improvement on the part of the apprentices in their theoretical work, which shows considerable care and patience on the part of the instructor. The apprentices' farm was maintained at a high standard throughout the year, showing that the apprentices were interested in their work and that their cultural operations were well carried out. The physical training has considerably improved the apprentices. They are a fine, fit lot of young men.

Every encouragement was given to the sports and recreation of these youths. Football and cricket matches were arranged and the results were very creditable.

DIVISION OF FORESTS.

32. The report of the Division of Forests forms Part VI of this report. Mr. K. G. Burbridge, Conservator of Forests, was Acting Commissioner of Lands and Forests from the 12th May to the end of the year. Consequently the Senior Assistant Conservator of Forests was engaged in administrative work, with the result that a distinct shortage of staff was felt by this division, as the leaves of officers had to be fitted in as well. Owing to this, very little reservation work was carried out. The Assistant Conservator of Forests made certain preliminary surveys of forests and the routine work of existing reserves was supervised. Assistance was given in the oil-palm investigations and the rubber tapping at the Kenema plantation was started.

DIVISION OF INSPECTION.

31. The report on the above division forms Part VII of this report. The revised Produce Laws came into force during the year. They include the Native Produce (Standardisation and Grading) Ordinance and an Ordinance for the compulsory protection of water-borne produce. The object of these measures is explained by the Inspector of Plants and Produce in paragraph 11 of his report.

Palm oil was brought under inspection, but no active steps were taken, as explained by the Inspector of Plants and Produce. The expenditure of this division totalled £1,004 17s. 7d. and its revenue was £1,707 7s. 0d., showing an excess of revenue over expenditure of, £702 9s. 5d. Mr. G. Tuach, Inspector of Plants and Produce, is to be congratulated on his energy, zeal and interest in keeping a watchful eye on the quality of kernels being shipped. The results of his labours are markedly satisfactory.

VISIT OF THE HONOURABLE W. G. A. ORMSBY-GORE, M.P.,
TO SIERRA LEONE.

32. Preparatory to the visit of the Honourable W. G. A. Ormsby-Gore, M.P., to Sierra Leone in April, this department was instructed to prepare memoranda on various subjects. During the early part of the year the staff was occupied in collecting the data and in submitting the necessary information. The Honourable W. G. A. Ormsby-Gore and Party, during their stay in this Colony, visited the main Experimental Station at Njala on the 21st and 22nd April.

CANADIAN NATIONAL EXHIBITION, 1926.

33. The Sierra Leone Government participated in the Canadian National Exhibition, 1926, at Toronto during August. Nigeria and the Gold Coast were communicated with to ascertain whether their Governments would join Sierra Leone in putting up a combined West African exhibit. Neither of these colonies were willing to participate.

The Lands and Forests Department prepared all the exhibits for this Exhibition and Mr. M. T. Dawe, O.B.E., was appointed Exhibition Commissioner for Sierra Leone. Mr. Percy W. Clemens, retired Assistant Treasurer of Sierra Leone, who was visiting Canada at the time, very kindly offered his service and was appointed Assistant Commissioner.

A full report has been submitted by Mr. M. T. Dawe, O.B.E., on the part Sierra Leone played at the 1926 Exhibition. As a result of this Government's action a monthly service of steamers has been renewed between Canada and this Colony and numerous enquiries have been made by manufacturers in Canada. Although the effects of this propaganda are not visible at present, there is no doubt that it will help to stimulate trade between the two countries in the future. Mr. M. T. Dawe, O.B.E., is to be congratulated on the interest he has aroused in Canada in connexion with Sierra Leone and its products.

VISIT OF THE COMMISSIONER OF LANDS AND FORESTS TO FRUIT-GROWING AREAS IN U.S.A.

34. On the close of the Canadian National Exhibition, 1926, at Toronto, Mr. M. T. Dawe, O.B.E., undertook, in the interests of the fruit farming question in Sierra Leone, a visit to California and Florida to learn in particular something about the citrus industry of those States. Mr. Dawe's visit was unofficial and the information collected will prove of great value to this Colony in the future.

FINANCIAL.

35. A statement of revenue and expenditure for the department for the year is attached.

I have the honour to be,

SIR,

Your obedient servant,

DOUGLAS W. SCOTLAND,

Acting Commissioner of Lands and Forests.

FINANCIAL.

The following is a statement of revenue and expenditure for the department for the year :—

REVENUE.

	Horticulture		Research and Entomology		Inspection		Agriculture		Forests		Veterinary		Total	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.
LICENCES:														
Crown lands	£	s. d.	£	s. d.	£	s. d.
Produce	1,506	7 6	...	...	19	14 0	19	14 0	1,506	7 6
Fines for contravention of Produce Ordinance	194	19 6	...	...	...	...	194	19 6	194	19 6
Fines for contravention of Weights and Measures Ordinances	6	0 0	...	...	...	...	6	0 0	6	0 0
Departmental fines	8	1 10	4	9 0	15	3 4	15	3 4
FEES OF COURT, ETC.:														
Sale of Government stores	3	12 3	0	9 9	4	2 0	4	2 0
Sale of produce	419	14 2	...	...	419	14 2	419	14 2
MISCELLANEOUS RECEIPTS:														
Other miscellaneous receipts (Royalties—Colonial Reserve)	9	17 0	9	17 0	9	17 0
TOTAL REVENUE	£	2 12 6	...	...	1,707 7 0	...	431 8 3	...	34 9 9	...	2,175 17 6	...	2,175 17 6	...

EXPENDITURE.

	Head-quarters.			Research.			Inspection.			Agriculture.			Forests.			Veterinary.			Total.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
PERSONAL EMOLUMENTS:																					
Salaries	2,250	8	9	656	11	3	5,853	6	5	3,565	16	3	14,454	6	5	...	...	...
Duty allowance	200	0	0	199	9	3	639	9	2	...	...	...
Seniority pay	41	8	0	...	...	...	...	...	...	23	8	5	64	16	5	...	...	...
African assistants	2,656	6	3	2,656	6	3	...	...	...
Allowance in lieu of quarters	6	0	0	123	5	11	21	4	1	150	10	0	...	...	...
Allowance to motor driver	5	0	0	...	...	...	5	0	0	...	...	...
Total Personal Emoluments— <i>carried forward.</i>	£	2,368	3	8	2,291	16	9	662	11	3	6,181	12	4	6,466	4	3	17,970	8	3	...	...

	Headquarters.			Research.			Inspection.			Agriculture.			Forests.			Veterinary.			Total.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Total Personal Emoluments—brought forward	2,368	3	8	2,291	16	9	662	11	3	6,181	12	1	6,166	4	3	17,970	8	3			
OTHER CHARGES.																					
Contingencies	84	16	8	42	0	9	21	18	8	37	14	5	26	16	10	0	1	0	213	8	4
Telephone service	85	18	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	85	18	6
Transport, travelling allowances and passages	190	18	1	554	11	10	276	...	1	10	2,311	8	3	1,291	10	0	...	...	4,630	12	0
Transport allowances	72	0	8	69	5	8	...	...	...	...	125	3	6	181	5	5	...	...	447	15	3
Chemicals and apparatus ... ..	...	...	...	544	17	1	...	...	...	...	...	...	...	...	...	...	...	...	544	17	1
Agricultural development ... ..	...	...	...	...	...	...	...	...	...	...	322	2	1	...	...	...	...	...	322	2	1
Agricultural shows	1	13	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	13	10
Labour and native assistants ... ..	...	...	...	...	...	...	...	...	...	...	3,303	16	8	970	8	7	...	...	4,311	9	3
Tools, appliances and materials	...	...	...	...	...	...	...	...	...	...	407	19	10	38	2	0	...	...	458	11	8
Uniform for African subordinate staff	4	3	11	16	15	10	...	...	7	11	...	...	...	225	8	2	...	...	273	15	10
Grant to Imperial Bureau of Mycology	125	0	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	125	0	0
Museum outfit	51	14	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	51	14	8
Contribution to Central Forestry, Training Institute	279	11	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	279	11	3
Collecting specimens for Imperial Institute	2	0	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	0	0
Handbook of Flora of West Africa	69	11	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	69	11	0
Contribution to Imperial College of Agriculture, Trinidad	250	0	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	250	0	0
Library ... ..	...	...	...	85	13	7	...	...	...	...	29	7	10	8	18	10	...	...	124	0	3
Rent of office buildings	247	5	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	247	5	0
Rent of experimental stations ... ..	...	...	...	...	...	...	...	...	...	...	9	15	0	...	...	...	...	...	9	15	0
Electric light and gas plant ... ..	...	...	...	101	7	6	...	...	...	...	...	...	...	...	...	...	...	...	101	7	6
Upkeep of lawns around Court	14	5	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	14	5	4
Seeds and plants, purchase of ... ..	...	...	...	...	...	...	...	...	...	...	243	3	9	...	...	...	...	...	243	3	9
Seeds and plants, distribution of ... ..	...	...	...	...	...	...	...	...	...	...	401	0	6	...	...	...	...	...	401	0	6
Seeds and seedlings ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	6	2	2	...	...	6	2	2
Laboratory appliances ... ..	...	...	...	...	...	...	...	...	...	...	141	17	4	...	...	...	...	...	141	17	4
Cotton-ginning, expenses <i>re</i> ... ..	...	...	...	...	...	...	...	...	...	...	64	19	5	...	...	...	...	...	64	19	5
Survey instruments ... ..	...	...	...	...	...	...	...	...	...	...	46	8	11	57	13	9	...	...	104	2	8
Outfit allowance	60	0	0	60	0	0	...	...	...	...	60	0	0	...	...	...	...	...	180	0	0
Other Charges—carried forward	£			1,444	12	3	325	11	5	7,507	17	6	2,809	5	9	49	14	10	13,676	0	8
Total Personal Emoluments—carried forward, <i>£</i>	2,368	3	8	2,291	16	9	662	11	3	6,181	12	1	6,166	4	3	...	...	...	17,970	8	3

EXPENDITURE—continued.

	Headquarters.			Research.			Inspection.			Agriculture.			Forests.			Veterinary.			Total.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Personal Emoluments—brought forward	2,308	3	8	2,294	16	9	632	11	3	618	12	1	6,446	4	3	...	...	...	17,970	8	3
OTHER CHARGES—brought forward	1,538	18	11	1,444	12	3	325	11	5	7,507	17	6	2,809	5	9	49	14	10	13,676	0	8
Tents and camp equipment ...	...	...	...	...	...	...	16	14	11	...	...	...	37	5	9	...	...	...	54	0	8
Books, stationery, etc. ...	...	...	...	...	...	...	...	...	...	51	3	6	...	...	...	...	...	...	51	3	6
Compensation for removal of Bundaye-lahun village ...	...	...	...	...	...	...	...	...	...	...	...	...	10	0	0	...	...	...	10	0	0
Expenses in connexion with Kenema Rubber Plantation ...	...	...	...	...	...	...	...	...	...	...	...	...	474	9	6	...	...	...	474	9	6
TOTAL OTHER CHARGES ...	1,538	18	11	1,444	12	3	342	6	4	7,559	1	0	3,331	1	0	49	14	10	14,265	14	4
TOTAL LANDS AND FORESTS DEPARTMENT £	3,907	2	7	3,736	9	0	1,004	17	7	13,740	13	4	9,797	5	3	49	14	10	32,236	2	7

PART II.

REPORT OF THE DIVISION OF RESEARCH.

SECTION I.

30th March, 1927.

TO THE HONOURABLE THE COMMISSIONER OF LANDS AND FORESTS.

I have the honour to submit herewith my report for the year 1926.

2. The Division of Research was increased by the appointment of a Mycologist during the year, and Mr. F. C. Deighton, B.A. (Cantab.), arrived and took up duties as Mycologist on 17th July. I attach a copy of his report for 1926.

3. The departmental museum was opened on 1st September. A great deal of interest is being taken by the inhabitants of, and visitors to, Freetown, and 5,748 people visited the museum during the year. This is at a rate of about sixty visitors a day.

CHEMICAL SECTION.

4. *Staff*.—The Agricultural Chemist was on leave from 29th April to 9th October and the Assistant Agricultural Chemist was on local leave from 27th October to 24th November.

An African Laboratory Assistant, Mr. R. D. J. Macauley, was appointed to the chemical section and took up duties on 1st September.

5. The work of the section for the year has been to follow up more closely the work commenced in 1925, especially with regard to soils, as very little is known of the types of lateritic soils such as are found in Sierra Leone.

6. The following is a summary of the samples received:—

SOILS :

Northern Province	...	...	...	15	
Central Province	...	...	...	254	
Southern Province	...	...	...	103	
Colony	...	...	...	98	
				<hr/>	470
Palm produce	...	...	...	...	8
Water	...	...	...	...	11
Miscellaneous agricultural products	...	...	...	...	24
Unclassified	...	...	...	...	31
				<hr/>	
Total			...		<hr/> <hr/> 544

7. *Soils*.—During the year 625 samples of soils were examined. These of course include a number of soils collected during 1925, and not examined till 1926. Last year the results of these analyses were printed in a separate report, but this year it is proposed to include the results with this report. The soils are grouped in accordance with the provinces from which they were sent and the figures obtained by analyses are given in the following tables:—

NORTHERN PROVINCE SOILS.
SUMMARY—(50 SOILS).

District.	Chiefdom.	Town.	Character.	Sample Nos.	Stones. %	FINE EARTH.				
						Sand. %	Silt and Clay. %	pH.	Organic Matter. %	Lime Requirement.
Koinadugu	Simiria	Mabonto	Sandy	10-13	7-14	86-87	13-14	5.8-6.2	3.8-5.6	10-26
	Dohahun	Kagberi	"	34-37	11-12	77-87	13-23	4.5-4.9	1.8 (humus)	18-3
	Makali		"	117-118	Nil-3	66-71	20-34	5.2	—	10
	Tonkoli Forest Reserve		"	96-104 109-116	Nil-15	63-94	6-37	4.2-5.2	2.9 (humus)	15-33
"	Gowahun	Mayatta	Gravelly	46-49	72-84	66-72	28-34	5.0-5.3	1.48 (humus)	15-27
Bombali	Tonkoli Forest Reserve		"	105-108	29-44	64-76	23-36	4.2-4.5	7.4 (humus)	24-28
	Kolifa	Makump	Sandy	483-486	3-16	69-86	14-31	4.4-4.8	0.6-1.6 (humus)	20-30
	Safroko Limba	Binkolo	"	518-520	3	80	20	5.0	1 (humus)	20
	Bombali V	Makeni	"	976-979	Nil-5	76-80	20-24	4.3	—	2-25

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CENTRAL PROVINCE SOILS.
SUMMARY—(363 SOILS).

District.	Chiefdom.	Town.	Character.	Sample Nos.	Stones. %	FINE EARTH.				
						Sand. %	Silt and Clay. %	pH.	Organic Matter. %	Lime Requirement.
Kono	Bare	Gandahun	Gravelly	449-452	20-46	57-78	22-45	—	—	40-44
"	Mafundo	Kamiendo	"	454-457	17-52	73-75	25-27	—	—	05-16
"	Ley	Saiana	"	458-461	9-45	56-77	23-34	—	—	3
"	Bambara	Kunjo	"	1077-1078	28-41	82	18	5.25	—	—
"	Bense	Sefadu	"	1087-1088	46-48	55-56	44-45	5.0	2.4-4.7	2
"	"	"	Gritty (small stones)	1093-1127	15-35	60-75	25-40	4.9-5.3	1.3-3.6	2-26

CENTRAL PROVINCE SOILS—*contd.*

District.	Chieftom.	Town.	Character.	Sample Nos.	Stones, %	FINE EARTH.				Lime Requirement.
						Sand, %	Silt and Clay, %	pH.	Organic Matter, %	
Kono	Gowahun	Kangama	Sandy	50-54	14-20	65-80	20-35	5-5.4	1.3 (humus)	.2-.28
"	Gourama	Walehun	"	119-122	Nil-3	66-71	29-34	4.2-5.3	—	.21-.3
"	Sandoh	Kayama	"	163-167	1-13	68-79	21-32	—	—	—
"	Bense	Yaradu	"	186-189	5-9	64-80	20-36	—	—	—
"	Wando	Bama	"	219-222	3-9	61-83	17-39	—	—	.02-.08
"	Nimini Yema	Jaiama	"	239-242	Nil-14	66-80	20-34	—	1.5-2.0	.2
"	Gorama	Kangama	"	259-262	Nil-1	60-76	23-40	—	—	.24
"	Bambara	Gelihun	"	262-270	Nil-8	64-83	17-36	4.3-4.8	—	.22-.26
"	Sando	Kayama	"	395-398	Nil	73-83	17-27	—	—	.21
"	Levuma	Baima	"	399-402	2-8	60-79	21-40	—	—	.27-.36
"	Bane	Koardu	"	407-410	3-9	67-78	22-33	—	—	.26
"	Sowa	Kainkordu	"	423-434	Nil-6	66-80	20-34	—	—	.26-.35
"	Faima	Waiama	"	435-438	Nil-15	71-82	18-29	—	—	.24
"	Faima	Njagbwima	"	786-789	1-9	74-91	19-26	4.2-4.5	—	.24
"	Bambara	Kunjo	"	1079-1080	9-17	55-73	27-45	5.3	—	—
"	Bense	Sefadu	"	1083-1086	1-5	65-76	24-35	4.8-5.0	.98-3.15	.21
"	Levuma	Baiama	"	1082	3	66	34	—	—	—
"	Bense	Sefadu	"	1089-1092	6-14	60-77	23-40	4.8-5.3	.9-2.0	.14-.26
"	Sando	Yamandu	Gravelly	158-162	27-62	66-77	23-34	4.2	—	.16
"	Faima	Njagbwima	"	190-193	14-38	65-74	26-35	—	—	.26
"	Lepiana	Baoma	"	223-226	54-68	71-77	23-29	—	—	.31-.38
"	Gorama	Langulama	"	231-234	18-32	66-84	16-34	4.5	—	.27-.39
"	Nimini Korro	Njahama	"	168-171	45-67	54-86	14-46	—	—	.22-.26

CENTRAL PROVINCE SOILS—*contd.*

District.	Chiefdom.	Town.	Character.	Sample Nos.	Stones, %	FINE EARTH.				Lime Requirement.
						Sand, %	Silt and Clay, %	pH.	Organic Matter, %	
Kono	...	...	...	...	...	...	...	...	...	...
"	Nimini Korro	Futingaya	Gravelly	247-250	16-49	80-82	18-20	—	—	11-18
"	Bambara	Panguma	"	271-274	19-61	69-83	17-31	4.8	—	22-26
"	Sando	Yamaudu	"	391-394	37-65	74-77	23-26	—	—	21-28
"	Bambara	Panguma	Sandy over- lying gravel	61-64	8-48	67-77	23-33	4.8-5.3	—	27
"	Nimini Yema	Njahama	"	123-126	2-60	74-76	24-26	4.2-5.2	—	26
"	Ley	Saiana	"	198-202	4-63	55-65	35-45	—	—	24-33
"	Gurama	Punduru	"	235-238	6-97	45-68	32-55	5.5	—	24
"	Nimini Yema	Kwedu	"	243-246	8-54	58-79	21-42	—	—	19
"	Nimini Korro	Jaiama	"	251-258 375-378	6-74	64-78	23-36	—	—	14-31
"	Faina	Sanduru	"	790-793	2-33	63-73	27-37	—	—	22-3
"	Fiyamba	Bunjema	"	820-823	1-29	76-79	21-24	—	—	24
Pendembu	Upper Bambara	Pendembu	Gravelly	494-497	42-70	42-75	25-58	5-4	—	1
"	Kisi Tung'i	Buyedu	"	506-509	41-45	77-89	11-23	—	—	22-27
"	Luawa	Nyandehun	"	510-513	26-47	57-76	24-43	—	—	30-32
"	"	Geima	"	514-517	15-40	70-88	12-30	—	—	18-2
"	Kamara	Tumudu	"	782-785	47-60	66-73	27-34	5.0-5.2	—	29-41
"	Luawa	Kulalahun	"	886-901 911-913	32-66	46-83	17-54	4.3-5.7	1.3-7.2	14-38
"	Kisi Kama	Dia	"	903-906	43-52	65-89	11-35	—	—	—
"	Kisi Teng	Kangama	"	907-910	22-58	67-78	22-33	—	—	—
"	Upper Bambara	Pendembu	"	972-975	32-82	66-71	26-34	4.3	—	25-31
"	Jalahun	Daru	Sandy	138-145 150-157	Nil-8	52-73	25-48	—	—	28-42
"	Penguia	Woroma	"	403-406	1-18	59-67	33-41	—	—	28-33

CENTRAL PROVINCE SOILS—*contd.*

District.	Chiefdom.	Town.	Character.	Sample Nos.	Stones.	Sand.	FINE EARTH.			
							Silt and Clay	pH.	Organic Matter.	Lime Requirement.
Pendembu	Peje East	Manowa	Sandy	411-414	Nil	66-76	24-34	—	—	25-29
"	Luawa	Sukudu	"	778-781	1-4	57-74	26-43	4.4	—	19-24
"	Peje East	Manowa	"	994-997	1-2	66-76	24-34	4.2	9-1.8	26-34
"	Jaluhun	Daru	Gravelly	134-138	22-63	50-74	26-50	4.3	—	26-32
"	"	"	"	146-149	63-74	52-67	33-48	—	—	30-36
"	"	"	Sandy over-lying gravel	131-133	4-66	68-81	19-32	4.2	—	25-29
"	Luawa	Kailahun	"	383-386	5-54	65-73	27-35	—	—	3
"	Upper Bambara	Pendembu	"	498-501	Nil-70	67-75	25-33	—	—	32
"	Kisi Teng	Koindu	"	502-505	1-59	61-74	26-39	—	—	36
Kenema	Bo	Bo	Sandy	211-214	Nil-14	71-83	17-29	4.3	—	22-26
"	Nongoea	Kenema	"	215-218	Nil-3	72-87	13-28	4.3	—	22-32
"	Small Bo	Blama	Gravelly	203-210	66-91	37-75	25-63	4.4-5.2	—	30-46
"	Simbaru	Boajibu	Sandy over-lying gravel	55-60 227-230	2-41	74-84	16-26	4.3	1.0	2
"	Nongowa	Lago	"	275-278	2-70	52-83	17-48	—	—	25
Moyamba	Fakoe	Makori	Gravelly	824-827	56-84	60-74	26-40	—	—	38
"	Kaiyamba	Moyamba	"	902-969	27-70	39-69	31-61	4.2-4.5	2.5	26-37
"	Fakoe	Waterloo	Sandy over-lying gravel	840-843	1-77	69-71	29-31	—	—	—

SOUTHERN PROVINCE SOILS.
SUMMARY—(165 SOILS).

District.	Chiefdom.	Town.	Character.	Sample Nos.	Stones. %	FINE EARTH.					Lime Requirement.
						Sand. %	Silt and Clay. %	Organic Matter. %	pH.		
Pujehun	Panga	Pujehun	Sandy	65-72	Nil-2	75-91	19-25	3-3	4-2	17-39	
"	Kpaka	Koindu	Very sandy	1010-1013	Nil	94-96	4-6	—	—	12	
"	Pukump (Krim)	Messima	"	1014-1021	Nil	92-98	2-8	—	—	08-12	
"	Kpaka	Dibbia	"	1022-1023	Nil	96-99	1-4	—	—	—	
"	Bonasa (Krim)	Bona	"	1025-1029	Nil	95-97	3-5	—	—	08	
"	Manosa (Krim)	Kasse	"	1030-1033 81-84	Nil	97-99	1-3	—	—	—	
"	Panga	Pujehun	Gravelly	953-956	46-61	58-77	23-42	2-4	4-1-5-1	3	
"	Giema	"	"	1049-1056 1061-1064	23-62	54-75	25-46	1-8-3-8	4-3-5-4	2-3-4	
"	Goru	"	"	1057-1060	30-58	80-86	14-20	3-6	4-5	1	
"	Panga	"	Sand over-lying gravel	77-80	4-48	55-75	25-45	2-2	4-2-5-1	3-1-4-1	
Ghangbama	Ribbi	Mabang	Sandy	878-883 {926-928 931-938 867-869 314-317}	Nil-4	68-83	17-32	1-3	4-3-5-2	18-25	
"	Bomatoh	"	"	318-321	Nil	78-85	15-22	1-0	5-2-	2	
"	Kassanko	"	"	322-325	Nil	83-85	15-17	1-8	5-25	17	
"	Forodugu	"	"	342-345	Nil	81-85	15-19	1-0	—	1	
"	Katunka	"	"	346-349	Nil-5	73-91	9-27	1-4	—	3	
"	Mattru	"	"	871-877 929-930	Nil	60-92	8-40	1-5	—	2-4	
"	Ribbi	Mabang	Gravelly	941-944	54-78	63-80	20-37	1-8	4-3	2	
"	Jong	Mattru	"	1073-1076	43-83	65-71	29-35	—	—	4	
"	Bumpe	"	"	941-944	58-73	82-91	9-18	3-6	5-2	5	
"	Banta	Mokelli	"	941-944	2-45	53-83	17-47	—	—	2-3	

District.	Chieftain.	Town.	Character.	Sample Nos.	Stones.	FINE EARTH.			
						Sand.	Silt and Clay.	Organic Matter.	pH.
Mao River	Ghemma	Sulina	Very sandy	1038-1041	Nil	97-99	1-3	...	...
	"	Juring	"	1042-1044	Nil	89-95	5-11	...	...
	Makpelli	Gorahm	Gravelly	1065-1068	14-50	68-73	27-32	...	18-5-1
	Soto	Zone	"	1069-1072	40-29	77-84	16-23	24-5-7	5-0
Sembuhm	Bagan	Sembuhm	Sandy	306-309	Nil	71-83	17-29	2-7	5-7
	"	Tumba	"	310-313	Nil-1	74-86	14-26	4-0	5-2
Sumbuya	Labu	Sumbuya	Gravelly	949-952	50-70	52-66	34-48	...	...
	Kpaka	"	"	1045-1047	71-80	66-91	19-34	...	...

COLONY SOILS.

SUMMARY OF SOILS.

Town or Village.	Sample Nos.	Character.	Stones.	Sand.	Silt and Clay.	FINE EARTH.		
						pH.	Organic Matter.	Lime Requirement.
Wilberforce Station	480-493	Gravelly	22-42	19-61	39-51	4-5	2-5-2-9 (humus) 3-3-4-1	4
Murray Town	746-748	"	67-73	60-62	38-40	4-5-4-9	...	27-36
Aberdeen	762-765	"	59-76	53-73	27-47	4-3-5-2	...	34-4
Freetown (High Bay)	2051-2059	"	29-61	38-53	47-62	5-2	1-8-5-2	38-46
Freetown (St. George's Valley)	2060-2065	"	20-78	40-59	41-60	—	2-0-4-0	...
Aberdeen	766-768 766-769	Sandy	1-18	66-73	27-34	4-5-5-7	...	15-23
"	770-773	Very sandy	Nil-3	93-96	4-7	5-0-5-2	...	06-09
Regent	711	Clay loam	4	44	56	5-4	...	23

8. The above tables give a general indication of the character of the soils of the Colony and Protectorate. The soils are mainly of two kinds, a lateritic gravelly soil and a brownish sandy soil. All the soils are acid in reaction, sometimes markedly so, and investigations have been carried out in order to determine the origin of acidity in Sierra Leone soils. The results published last year showed that the organic matter content of the soil was only partially responsible for the high degree of soil acidity frequently met, and an analysis of the clay fractions of the various soils, together with analysis of the parent rock, tend to show that the development of acidity in the soil is due to the form of weathering which takes place in a country where the temperature is high and the rainfall heavy.

9. *Lateritisation*.—The action of weathering agents in producing the type of soil we have in Sierra Leone is called “lateritisation.” The original rock usually contains a high proportion of silica as well as varying quantities of alumina, iron, calcium, sodium, potassium, etc. The results of weathering in a temperate climate are disintegration and partial decomposition, various silicates some silica, alumina, iron oxides, etc., being formed. Most of the soils in temperate climate are formed in this way. In a tropical climate with a heavy rainfall such as Sierra Leone, more complete decomposition takes place as a result of the weathering agents, and the more soluble constituents such as sodium, potassium and calcium, etc., are nearly all washed away; a large proportion of the silica may also be washed away, while the alumina and iron oxides are left. These latter form the chief constituents of laterite soils.

10. It was once thought that the characteristic red colour of some soils was a clear indication of lateritisation, but it has since been found that red soils are not necessarily laterites and that brown or even black soils may be lateritic. It is now accepted that colour is not a certain indication of laterite, the essential character of laterite being a large proportion of alumina and a small proportion of silica. Accepting this definition all our soils in Sierra Leone are of a lateritic nature, whether of the common red gravelly soil (locally called “laterite”), the brown alluvial soils or even the black marshy soils. All these soils have one common characteristic and that is a high proportion of alumina to silica in the clay fraction.

11. Investigations as to the degree of lateritisation of the various types of soil in Sierra Leone are being conducted and it is hoped that during 1927 the results will be sufficiently complete to warrant publication.

12. During the year the Assistant Agricultural Chemist (Mr. H. C. Doyne) read a paper on “Soils and methods of improving their fertility” at a meeting of the Sierra Leone Agricultural Society. This paper was published as Pamphlet No. 2 of the Agricultural Society.

13. *Oil-palm*.—In my report last year a number of detailed analyses of oil-palm fruits was given. This year a number of samples were submitted for analyses or identification, but with two exceptions these were of no special interest. One exception was a sample of the “mantled” variety of oil-palm, a sample of which (and the first known in Sierra Leone) was found in the Nigerian oil-palm plantation at Njala.

The interesting point about this variety is that in addition to the ordinary pericarp, there is surrounding this, a swollen perianth which is also oil bearing. An analysis of this fruit gave the following figures:—

Per cent. pericarp oil on dry fruit	36.6
„ Kernels „	11.4

14. Samples of the fruit were submitted to Kew for identification and the Director of Royal Botanic Gardens reported that the fruit was that of the “mantled” type, *Elais guineensis* var. *Poissonii*, A Chev. and had been recorded from the Cameroons Togoland and recently from the Gold Coast, but not previously from Sierra Leone. It is probable that it was introduced with seed from Nigeria. The two trees on which these “mantled” fruit were found also produced heads of fruit which were not mantled. In one case two “mantled heads and seven ordinary heads were borne by the same tree while in the other case three “mantled” heads and two ordinary heads appeared on the tree simultaneously. The fruit which were not mantled were of the thick shelled type.

The other interesting sample of oil-palm fruit was submitted by the Provincial Superintendent of Agriculture, Central Province. The local name of this variety was given as “Gbiwei.” On analysis the following figures were obtained:—

Percentage of pericarp	...	...	...	92.9
Percentage of nut	...	...	...	7.1
Percentage of pericarp oil on fruit	...	...	...	64.4

The fruit was very similar to Tugbui and there is little doubt that it was a well developed sample of this type.

15. An analysis of the figures from the Nigerian oil-palm plot gave some interesting results as to the size of the heads and the proportion of fruit to head during the year, these results are given below :—

Month.						Average Weight of Head (lb.)	Percentage of Fruit in Head (lb.).
January	...	...	...	...	...	3.05	55.3
February	...	...	...	...	...	2.42	69.7
March	...	...	...	...	...	4.19	56.6
April	...	...	...	...	...	3.86	67.2
May	...	...	...	...	...	4.50	69.7
June	...	...	...	...	...	3.50	59.8
July	...	...	...	...	...	3.45	58.0
August	...	...	...	...	...	3.09	51.6
September	...	...	...	...	...	4.61	54.1
October	...	...	...	...	...	5.18	58.1
November	...	...	...	...	...	6.09	71.3
December	...	...	...	...	...	7.45	80.8

There was during the year a general increase in the size of the heads as the palms aged.

16. Individual yields were taken of all the trees of which there are three types, namely thin shelled, medium shelled and thick shelled types. The average yield of fruit per tree was as follows :—

Thin shelled type	...	...	...	24 lb. fruit per tree
Medium shelled type	...	...	...	20 „ „
Thick shelled type	...	...	...	26 „ „

The analyses of these types in the laboratory gave the following proportions of oil and kernels :—

Type.				Per Cent. Oil to Fruit.	Per Cent. Kernel to Fruit.
Thin shelled	...	...	...	34.9	8.5
Medium	...	...	...	23.6	6.7
Thick shelled	...	...	...	20.9	12.0

The palms at Njala are sown twenty-four feet apart or seventy-six to the acre. Combining the laboratory figures for composition with the field figures for yields we get the following yields of oil and kernels per acre for the different varieties.

Yield of oil-palms in their sixth year :—

Type.				Weight of Fruit per Acre (lb.).	Weight of Oil per Acre (lb.).	Weight of Kernels per Acre (lb.).
Thin shelled	...	...	...	1,824	635	155
Medium shelled	...	...	...	1,520	356	102
Thick shelled	...	...	...	1,976	413	237

Work is now being carried in conjunction with the Mycologist on the breeding of oil-palms. In selecting the parent stock attention is directed to the following points :—

- (a) Strong growth of palm
- (b) Good quality of fruit (i.e. high percentage of oil)
- (c) High yield of fruit per tree.

17. *Palm Kernels*.—A memorandum entitled, "The Palm Kernel Trade of Sierra Leone" was drawn up, showing the present position of the kernel trade, the possibilities of machinery for nut cracking and the possible expansion of the kernel industry if nut-cracking machinery and systematic collection of nuts were adopted. This memorandum has now been published as Bulletin No. 1 of the Lands and Forests Department.

18. *Piassava*.—Attention was called in last report to this product. The report of the Imperial Institute on a number of samples has now been received and we are awaiting a report from American experts before preparing the bulletin alluded to last year. The United Kingdom only takes about one-third of our total exports of piassava, and it is necessary to consult other markets before completing our investigations on this subject.

19. *Copra*.—The copra from two types of coco-nuts was examined, the first from a variety known locally as Nyenni and the second from a variety known as Hendoi. The "Nyenni" nut was small with a medium thick, sweet tasting flesh, the "Hendoi" nut was large with a thin rather tasteless flesh. An examination of the copra from these sources gave the following results :—

Type.				Moisture per Cent.	Coco-nut Oil per Cent.
Nyenni	...	...	...	5.4	58.5
Hendoi	...	...	...	4.4	54.2

The copra from the smaller variety gave the bigger yield of oil. Further investigation are in progress.

Sugar-cane.—During 1925 samples of Uba cane were imported into Sierra Leone by the Lands and Forests Department and samples of cane grown from these imported roots were examined in the laboratory. As a comparison samples of the local variety were also examined.

The results were as follows :—

				Uba Cane per Cent.	Local Cane per Cent.
Moisture	...	...	...	79.3	75.9
Cane sugar	...	...	...	12.3	13.3
Reducing sugar	...	...	...	1.6	1.5
Ash	...	...	...	0.56	0.52
Residue (chiefly fibrous and pectic substances)	...	...	...	6.3	8.7
Total sugar on dry cane	...	...	...	66.8	61.6

On a dry weight basis the Uba cane gave a higher proportion of sugar than the local cane. A curious feature of these canes was that the local cane had a much sweeter flavour than the imported cane and the natives would not readily eat the imported variety while they are very keen on the local variety. This might have its advantages if the cane were grown for the extraction of sugar rather than for local consumption. The Uba cane is reported to grow well, even on poor soil. I am indebted to Mr. B. W. Davies for samples of locally grown Uba cane.

21. *Experiments with Adco*.—There is a real need for organic manures in agricultural practice in Sierra Leone, and in lieu of farmyard manure, which is not available, an attempt was made to utilize local vegetation. The decomposition of the common fully grown cane grass under normal conditions is slow and 150 lb. of adco per ton of grass was used as a means of quickening the rotting process. A stock of about one ton of cane grass and another of the newly imported efwatakala grass were made and treated with adco as directed by the manufacturers of this product.

The bacterial action, stimulated by the adco, was expected to produce a high temperature; actually the temperature of the stock did not exceed 60°C at any time and the material did not shrink as quickly as expected. After six months both stacks were examined and analysed. The efwatakala grass stack has shrunk considerably in size and the material composing the stack with the exception of the somewhat woody stems of the grass had decayed. At that stage the efwatakala grass stack could have been used as an organic dressing to soil. The cane grass stack

was not so much rotted, the thick stems of the grass being still only partially decomposed. It was not in a suitable condition to be applied to soil as an organic manure. Both heaps of manure were sampled and analysed and the results are given below with an average analysis of ordinary farmyard manure, made from cow dung as a comparison :—

	Cane Grass Manure per Cent.	Efwatakala Grass Manure per Cent.	Farmyard Manure per Cent.
Moisture	80·6	76·2	75·0
Organic matter	12·0	11·9	16·0
Ash	8·2	11·9	9·0
Nitrogen	0·5	1·0	0·6
Phosphorus (as P_2O_5)	0·60	0·76	0·25
Potassium (as K_2O)	0·10	0·08	0·50

It will be seen that the adco manure is low in potash and that this constituent would have to be added to the manure to make it an all-round manure.

Although the results in the above trials were not very satisfactory, it must be borne in mind that both the efwatakala grass and the cane grass were fully matured and the stems, especially with the cane grass, thick and woody. If occasion permits the experiments will be repeated with younger grasses.

MISCELLANEOUS ANALYSES.

21. A number of miscellaneous analyses have been undertaken for the assistance of other departments. These include the analyses of waters for drinking purposes, examination of vegetable material for drugs (opium), examination of dead bodies for poison, and the examination of material for blood stains.

Mr. G. V. Herd, who has been working in the laboratory, has also analysed samples of milk, coffee, cocoa, tea, olive oil, ground-nut oil and cheese, such as are offered locally for sale.

F. J. MARTIN,
Agricultural Chemist.

LANDS AND FORESTS DEPARTMENT,
FREETOWN.

PART III.

REPORT ON THE ENTOMOLOGICAL SECTION.

17th February, 1926.

THE HONOURABLE THE COMMISSIONER OF LANDS AND FORESTS.

SIR,

I have the honour to submit my annual report for the year 1926.

The Entomologist returned from leave on 24th April. Since that date trekking has been particularly in connexion with the coco-nut scale, since it was desired to note the result of some experiments relating to treatment of outbreaks, and to study the attack of this pest in Sherbro and the Turtle Islands.

The remainder of the time has been taken up with various work at the Njala Experimental Farm.

Collecting has been continually carried on, in addition to the breeding out of larvæ found damaging various crops, and specimens submitted to the Imperial Bureau of Entomology and Mycology for identification.

Much spraying, fumigation and dusting have been done. Some new pests have been encountered, and these are recorded under the various crops.

CACAO.

Slight attacks of the Psyllid, *Udamostigma tessmanni*, Aulm., have been met with, but only to a small extent.

COCO-NUT.

The scale pest, *Aspidiotus destructor*, Sign., has broken out in Sherbro and the Turtle Islands, also at Njala.

At the last place it appeared in April, but the red fungus and ladybird beetles have been very plentiful and active, while manures have been applied and the ground cultivated, with the result that few living scales remain.

The fungus which was applied to trees in Freetown, has established itself in two places, but up to the month of October, it had not spread.

This, and ladybird beetles, are to be introduced to the Turtle Islands.

In and around Freetown, at Waterloo, and at places on the Moyamba-Shenge road, a very marked improvement in health of the coco-nut palms is to be observed.

Spraying against the Coco-nut Scale.—Spraying of affected palms with kerosene emulsion is found not to be of advantage in the presence of natural enemies.

Treatment of Seed to prevent Dispersion by its Transport.—In May, 1925, nuts for planting were treated with various liquids to kill any scale insects which may be present, and at the same time without detriment to the seed.

Unfortunately, many of the seeds were stolen, but the results are considered as indicating that immersion of the nut in kerosene previous to planting has no deleterious effect.

Some of the nuts failed to germinate owing to their being immature.

The figures given in the table were from observations made in August, 1926. Twenty nuts were used in each case, making a total of 120.

Treatment.	Healthy Plants.	Died after Germinating.	Failed to Germinate.	Missing.
Kerosene emulsion	5	1	1	13
Control	5	3	5	7
Kerosene : Palm oil, 1 : 1	4	1	9	6
Kerosene : Palm oil, 3 : 1	4	4	7	5
Kerosene	11	1	1	7
Control	8	0	0	12
	<hr/>	<hr/>	<hr/>	<hr/>
	37	10	23	50
	<hr/>	<hr/>	<hr/>	<hr/>
			Total	... 120

Effect of Application of Manures.—No particular improvement in health of palms, due to treatment with artificial manures, could be observed.

Palm or Weaver-birds are found to be responsible for local spread of the coco-nut scale, strips of leaves bearing the pest being collected and transported for the purpose of nest construction.

A popular article on the coco-nut scale and methods of dealing with it was issued towards the end of the year.

Coco-nut Borers.—*Archon centaurus*, Burm., has been received from two districts as affecting coco-nut palms.

The rhinoceros beetle, *Oryctes ovariensis*, P. de B., would appear to be of more common occurrence in the Southern Province. This species breeds in dead or dying palms, and in one palm at Shenge, very numerous eggs, about 70 larvæ, two pupæ and six adults were found.

This emphasizes the importance of the felling and quick destruction of dead palms.

It may be of interest to note that a mite was found to be attacking the eggs, but the identification has not yet been received.

Oryctes crebus, Burm., has been found attacking coco-nut palms in the Turtle Islands.

These three species more commonly attack palms up to four years old, by boring in the side, then making their way down the centre, often resulting in death.

They may be extracted by making an incision along the bore, or may be killed by poking with a sharp rod.

Rhina afzelii, Fhs., a large weevil, has occasionally been found to damage coco-nut palms in a similar manner.

COFFEE.

Shot Hole Borer.—Different varieties of coffee at Njala have been noted as bearing many dead and dying twigs and small branches, caused by the boring of a minute *beetle*. All stages of the insect could be found in the galleries, and the simplest method of control is the removal and burning of affected parts.

Some of these tunnels were inhabited by a species of *Thrips*, which appeared to attack the young flower buds.

COTTON.

Conditions have been much the same as last year, except that a few cases of stem and root boring by larvæ of a moth have been seen. This has not yet been identified.

CASTOR BEAN,

The larva of a moth, *Argyroploce wahlbergiana*, Zell, was reported by the Provincial Superintendent of Agriculture as seriously affecting the inflorescences of castor beans in parts of the Northern Province.

Much damage was at one period caused by the locust (*Zonocerus variegatus*, L.,) but this was quickly dealt with by means of a poison bait.

Lead arsenate used as a spray is effective.

CITRUS.

Orange, lime, lemon, etc., have suffered the usual attack of the locust, *Z. variegatus*, which shows a marked preference for lemon.

Limes in general have been damaged by the flea beetle, *Cercyonia citri*, Bryant., but it is conveniently controlled by the clipping and prompt burning of infested parts.

The scale insect, *Dinaspis annæ*, Melen., appears to be increasing on limes.

GINGER.

A large amount of ginger ("root") has been found to be attacked by a *scale insect* not yet named. They were so numerous in some cases as to be simply caked on. This pest evidently breeds also while ginger is in store, and it must make an appreciable difference to weight and quality. An attempt has been made to arrive at the extent of this, and two plots, one planted with fumigated, the other with untreated, ginger were laid out. A much better and healthier stand was given by the treated "root."

For purposes of distribution of "seed," all ginger after my arrival at Njala was fumigated with hydrocyanic acid gas.

KOLA.

There has not been much opportunity to study kola pests, but some work has been done.

With regard to the kola nut weevil, *Balanogastriis kolæ*, Desbr., it has been found that infestation may take place upon the tree, but they have only been observed as yet in the case of pods that have split.

There is also a *moth*, the larva of which bores in the nut, but the identification is not yet to hand.

The following figures will prove of interest: out of 627 nuts selected in December from part of the Njala harvest as bad—

587	were infested with kola weevil;
9	" " " moth larvæ;
30	" " " both the above; and
1	was without insect injury, and probably due to a fungus.

The figures for the nuts inspected during the December part of the harvest give totals of 162 lb. good nuts and 108 lb. bad nuts.

Relating to Life-history of the Weevil.—Information is desired as to the habits of the kola weevil, and the following particulars, ascertained in the laboratory during June, July, August, September and October, are available.

The eggs are deposited inside the nut about 1/32nd inch from the surface, or they may be placed by the parent on the side of one of the tunnels resulting from feeding of the larva or adult.

The egg hatches after five to six days, and the period from hatching to emergence of adult varies from fourteen to more than fifty-two days, this probably being due to the fact that some nuts dried more quickly than others, although this would not occur to the same degree in the field.

The duration of the larval and pupal stages was not determined.

One adult is capable of laying at least forty eggs at the rate of nine or ten a day, but the total number possible has not been worked out.

Weevils emerging one day, copulate the next day, and it is apparently two days before the female commences oviposition.

Adults lived in captivity for sixty-six days with food, and from nine to sixteen days without food.

The total minimum time required for one complete generation (emergence to emergence) is twenty-two days.

It would appear that the weevil will only deposit eggs when it has access to the nuts, and circumstances seem to indicate, that if sound pods are harvested separately, kept quite apart from others in a clean store, then despatched to Fréetown (if for export) in weevil-proof packages, no infestation will occur. A particular mesh for the canvas would be necessary to prevent entrance of the weevils. This would obviate the trouble and loss due to repeated selection.

With regard to the nuts in the other pods, it is hoped that some method of treatment may be devised in the near future.

A great deal of work remains to be done on this and other pests of kola.

Another leaf-roller, named *Lophocrama phœnicochlora*, Hmps., has been bred out, but it is not common.

A flea beetle, *Nisotra spidica*, Dalm., and another beetle named *Lycus sinuatus*, Schonh., have been observed to seriously damage the leaves in some cases, the latter especially on young plants.

In addition to the moth, *Eagyophlebus obesus*, Karsch., another branch borer, a beetle named *Glenea giraffa*, Dalm., has been encountered.

An insect which breeds in the pods and seed coats is the kola fruit-fly, *Pterandrus colæ*, Silv., which is very numerous.

Although this does not harm the nuts themselves, it prepares the way for other insects which do so, and thus possibly has a direct bearing on weevil attack.

Torma colæ. "China" is a small bug which proved to be a species new to science, and appears to be of much economic importance in certain areas at least, as almost the whole life of the insect is spent inside the flowers, their punctures resulting in the flower-fall.

They may be found in unopened buds, which suggests that the eggs are deposited in the flower tissues.

Work on the Psyllid, *Udamostigma tessmanni*, was commenced, but it had to be discontinued owing to an urgent call in connexion with a coco-nut scale outbreak.

Some spraying was carried out, but no decisive results are yet available. The nymphs and adults are killed by kerosene emulsion, but eggs are not affected.

It is evidently necessary that the life-history of this insect be worked out before successful treatment is possible.

Pruning of trees is one of the lines of investigation, and this brought to light the fact that after pruning, very much new growth is put on, and there is promise of a much better yield than is obtained under present conditions. In addition, the trees are kept within such dimensions that they may be efficiently treated with insecticides or fungicides and the crop is more easily collected, without damage to pods and nuts.

A small experimental plot has been laid out to facilitate observations and treatment.

In a report by the Provincial Superintendent of Agriculture, Central Province, data were given of infestation of kola with various pests.

These were analysed by the Director of Agriculture with the following results :—

Infested with	Psyllid	...	...	...	89.9 per cent.
"	Scale insects	...	...	...	67.4 "
"	Caterpillars (except leaf-rollers)	...	...	...	14.3 "
"	Twig borers	...	...	...	12.2 "
"	Mistletoe	...	...	...	12.2 "
"	Leaf-rollers	...	...	...	2.0 "

On certain trees affected with a complaint similar to "big bud" were to be found many *nites* and it is likely that these are the cause. The new growth in such cases is very stunted, while the twigs are short and thick, and no fruit is formed.

WINDS AND FLOWER-FALL.

It has been suggested that high winds, such as occur during tornados, may have a serious effect on the kola crop. Certainly innumerable flowers are blown off, and an examination after such a wind, the flowers being picked up at random beneath about 80 trees, gave the following results :—

Male flowers	...	...	...	214
Female flowers	...	...	...	6

In addition out of twenty-five fallen inflorescences observed, only one possessed female flowers.

It would appear, therefore, that there was little loss of crop due to wind.

OIL-PALM.

The only additional pest of importance noted during the year is a *mealy bug* which attacks the heads of palm fruit. It occurs in masses, but is not easily observed on account of its being covered over with earth by ants which tend them. It occurs in Njala and Sherbro Island and is doubtless in many other localities.

Two small species of beetle, *Cocotrypes perditor*, Bldf., and *Cocotrypes pygmaeus*, Eich., have been found to attack fallen palm nuts. The former was collected by the Provincial Superintendent of Agriculture, Northern Province, who reported that the damage was considerable. They bore through the hard shell of the nut and consume the kernel. The distribution of these is not known.

RICE.

The only pest seen on this crop is an *earwig*, which eats the soft grains from the ears, and in some cases destroyed over 10 per cent.

This earwig also occurs on *millet* and *maize*, but in these cases it adopts a stem-boring habit. It eats its way through from the outside, generally near the growing point, and lives inside the stem, where eggs are deposited and full development may be completed.

In the case of *maize*, an ear worm and a stem borer are serious, but have not been identified. They are both moths.

An attempt to control the former by spraying the "silk" with lead arsenate was unfortunately lost sight of in the general harvesting. It is, however, fairly certain that it would be effective if carried out early, with a further application at a later date.

A specie of bird causes much injury to the cobs, and so attracts various kinds of *beetles* which do further damage.

TURMERIC.

Aræcerus fasciculatus, de Geer., infested the dried material in store.

LOCUST.

Zonocerus variegatus, L., does a great deal of damage annually, and some efficient method of dealing with it is required. Some experiment has been carried out during the latter two months of the year and, although not complete, good results have been obtained.

The date of first appearance of the hoppers is very variable, depending upon the character of land in the district. At Njala the first invasion occurred near the end of September, while in the Colony they apparently do not come out until January. The first adult was seen at Njala at the end of October.

The ordinary means of control is collection by hand in the evening or early morning, when the insects congregate towards the tips of plants and are not active. In this condition they are easily shaken off into a convenient receptacle containing a little water with a small quantity of kerosene. If this method is practised as soon as the hoppers appear, and continued as found necessary, a good effect may be obtained.

With regard to low-growing crops, the gregarious habit of the pest in the evening and early morning may be made use of by the insertion in the ground of sticks about four feet long and at intervals of about 9 feet, the sticks to be about $\frac{1}{4}$ inch thick and preferably inclined at angle of about 20 from perpendicular. Collection of the hoppers is thus rendered possible.

POISON BAIT.

Various mixtures of salt, honey, lime-juice, Paris green and a carrier were tried. It was thought that rice hulls would be a convenient medium, but this was discarded owing to the great difficulty in obtaining a thorough mixture, and sawdust was used in its place. The following mixture was most efficient :—

Sawdust	...	...	...	1 bushel (about 17 lb.)
Paris green	...	...	...	...
Salt	...	...	...	...
Water	...	...	...	...

The sawdust and Paris green are mixed dry, the salt then incorporated, and the water added, the whole being thoroughly mixed. The quantity of water given was found to be the maximum which could be added for the mixture to be easily crumbled between the fingers.

APPLICATION.

The mixture is *very* thinly broadcast and, with practice, one bushel is sufficient to treat two acres. The main effect is visible after three to four days, and excellent results have been obtained on the experimental farm at Njala. Supplies of the bait have been sent to various political and agricultural officers, and their reports are awaited with interest.

One labourer can treat one acre in one hour, and the total cost per acre of one application is about one shilling. However, it is likely that smaller quantities of Paris green and salt will prove effective, and further tests are to be carried out.

In the case of large citrus trees, it was found that almost, but not quite, all the hoppers came to the bait, but in no other instance did this occur.

Cannibalism.—Some degree of cannibalism obtains with this species, but as to through how many individuals one dose of poison is effective, further work is necessary.

In one experiment on this point, after a period of six days, 20 hoppers had been eaten, out of 200, in the presence of a favourite food plant.

Food Plants.—In bush, the hoppers show marked preference for the “Christmas Tree,” *Alchornea cordifolia*. Mull, Arg., while in the open, the weed *Ageratum conyzoides*, Linn, is selected.

The latter when present may be made use of in the segregation of hoppers in certain areas by the cutting of this plant from around a small area, which results in the migration of the insects to the remaining patch. This is then easily treated.

Among economic plants, breadfruit seems to be most favoured, citrus next, lemon being preferred to others, then cassava, while in the absence of these the pest will feed on almost any plant. No *enemies* of this insect have been observed. Efforts to find the *eggs* and *breeding places* have so far been unsuccessful.

Termites.—These insects are well known to seriously affect many economic and ornamental plants, including citrus and coco-nut. In an attempt to prevent such damage, a series of coco-nut palms and citrus trees were painted, from the ground level to about one foot above, with a wash or paint made up of 1 lb. of quicklime and $\frac{1}{2}$ lb. lead arsenate. The quicklime is first slaked in as little water as possible, and when completed sufficient water is added to give the consistency of a thick cream. The arsenate is mixed, separately, with sufficient water to also resemble cream. The two are then thoroughly stirred together and the mixture applied by means of a brush. The trunks of the trees should be cleaned before application, especially close to the ground.

When properly applied, i.e. all cracks, hollows, etc., treated, this paint has proved quite effective, including cases where coco-nut palms were previously severely attacked up to a height of three feet. Work on these lines is to be continued.

Fumigation.—This process was carried out with cotton seed and ginger before distribution for planting. The erection of a fumigatorium early in 1927 will greatly facilitate such work. Seeds, etc., in store have been fumigated with carbon bisulphide.

Spraying.—Much spraying has been carried out, including nursery stock for distribution.

Breeding cages have been supplied during the year which have proved of great use.

Collections.—It was hoped to rearrange the reference collection, but there has not been opportunity. Many replacements of specimens are also necessary, owing to damage by moulds. An economic collection was prepared for the agricultural show at Segbwema.

Agricultural Apprentices.—The apprentices have been instructed in the preparation and application of insecticides, including poison dust, liquid sprays and poison bait, and were also given ample opportunity for practical work, under supervision.

Acknowledgments.—Grateful thanks are due to the Director and staff of the Imperial Bureau of Entomology and the Director and staff of the Imperial Bureau of Mycology, who rendered valuable assistance in determination of specimens and other matters.

I have the honour to be,

SIR,

Your obedient servant,

E. HARGREAVES,

Entomologist.

PART IV.

REPORT OF THE DIVISION OF AGRICULTURE, 1926.

15th March, 1927.

THE HONOURABLE THE COMMISSIONER OF LANDS AND FORESTS.

SIR,

I have the honour to submit the following report on the work of the Division of Agriculture and on agriculture generally for the year 1926.

INTRODUCTION.

2. A general account of the work of the division is given in the following pages. Detailed information in connexion with the experimental work carried out at the Central Experimental Station, Njala, and the work of the Provincial Superintendents of Agriculture and the Agricultural Instructor is to be found in the reports of these officers. The results of the valuable work of the Superintendents of Agriculture are summarized in this report. The meteorological reports are attached as Appendices I and II.

STAFF APPOINTMENT.

3. *European*.—Mr. P. J. Moss was appointed Provincial Superintendent of Agriculture on 31st March and assumed duty on 10th April.

LEAVE.

European Staff.—Mr. D. W. Scotland, Director of Agriculture, was absent from 13th October, Mr. J. W. D. Fisher, Provincial Superintendent of Agriculture, was absent from 4th August, until 31st December.

Mr. R. R. Glanville, Provincial Superintendent of Agriculture, was absent from 31st March until 31st July.

Mr. E. I. Nisbett, Provincial Superintendent of Agriculture, was absent from 1st September until 31st December.

STAFF CHANGES.

The Director was absent on leave from 13th October until the end of the year, and during this period Mr. R. R. Glanville acted as Director of Agriculture. Mr. J. W. D. Fisher resumed duty from local leave on 16th January. He was appointed Assistant District Commissioner in Moyamba District on 18th January in connexion with the railway strike and resumed his normal duty as Provincial Superintendent of Agriculture, Southern Province, and was in charge until 12th July.

Mr. J. V. R. Brown was in charge of the Central Province throughout the year and of the Northern Province from 31st March to 7th May and of the Southern Province from 21st July to the end of the year. Mr. P. J. Moss was in charge of Northern Province from 7th May to 12th August and of the Experimental Farm, Njala, from 27th August to the end of the year. Mr. E. I. Nisbett was in charge of the Experimental Farm, Njala, from 1st January to 26th August.

AGRICULTURAL DEVELOPMENT.

9. An increased staff of both European and African officers has enabled the division to extend the scope of its activities. The systematic efforts which were commenced in 1923 to extend the cultivation of export crops have been sustained and intensified, whilst several new branches of agricultural development have been investigated.

10. Each of the three provinces has now a Provincial Superintendent of Agriculture, and when permanent headquarters for these officers have been established, a proper system of reliefs arranged, and when a staff of trained agricultural assistants and overseers becomes available, as is hoped for soon, a great stride forward in agricultural development is expected. Progress is being hindered now through this shortage of trained native subordinate officers. Towards the end of 1927 the first group of the agricultural apprentices undergoing training at Njala will be available for appointment.

11. The activities of the division have again been directed principally to work on oil-palms, swamp rice, coco-nuts, cacao, ginger, castor beans, maize and cotton.

OIL-PALMS.

12. The oil-palm takes the first place on the programme since its products supply the principal source of wealth of the mass of the population of the country. Investigation of the oil-palm and its products commenced on an intensive scale in 1925 and this work has been carried on more widely during the year under review. The oil-palm survey has been continued to determine the distribution of varieties in chiefdoms. The results continue to indicate that by far the commonest variety is the kawai. The next important question under investigation is the relative productivity of the different varieties of oil-palm.

A commencement has been made with the establishment of oil-palm demonstration plots. Five-acre blocks of natural palm stands have been demarcated and leased from the Tribal Authorities at Pujehun and Sumbuya in the Southern Province and at Magburaka in the Northern Province. These plots are under the direct supervision of officers of the division. The object is to clear the plots by judicious thinning and planting up to about sixty-four palms to an acre. All unproductive palms are removed for planting purposes, the dominant type of palm on the plot is used. In this manner it is hoped to demonstrate to the natives the beneficial results to be derived from attention to their wild palm groves. A careful record is kept of the yield of each tree.

In the Southern Province there are fifteen demonstration plots of oil-palms which are under the surveillance of the district commissioners.

Nurseries of the hanoi variety of oil-palm have been made in twelve chiefdoms of the Pendembu District, Central Province. Each nursery is capable of supplying plants for a five-acre plantation.

SWAMP RICE.

13. Steady progress has been made in the Southern Province in the effort to bring the tidal swamp lands under rice cultivation. These lands are, for the most part, covered with mangrove forest and the clearing of this for rice is arduous work. At the principal centres, namely on the Bagru River below Sembehun town and on the Gbangbatuk creek, further extension work has been done under the supervision of three instructors. The crop was not completely harvested at the end of the year, but reports indicate that the yield will be lower than in 1925 owing to the damage the growing crop sustained from the abnormal floods in August and September.

Elsewhere throughout the Protectorate an effort is being made by agricultural and political officers to encourage the people to make use of as many of the swamps as possible for rice cultivation. Their efforts are meeting with considerable success. As far as possible, the transplanting method of cultivation as practised in this country by the Temne people is being demonstrated, as it is apparent that this method gives the most satisfactory crop. The Provincial Superintendents of Agriculture are roughly surveying these swamp areas in the course of their tours.

In the Pendembu District the success of the transplanting method of cultivation has been most striking. Thirty demonstration farms were made this year as against eleven in 1925. The results are not to hand, but the following lists indicate the yields of rice obtained:—

Chiefdom.			Town.	Area of Farm.	Yield, Bushels.	Yield per Acre.
Mando	...	...	Baiima	$\frac{3}{4}$ acre	31 $\frac{1}{2}$ bushels	42·0 bushels.
Mando	...	...	Levuma	$\frac{1}{2}$ "	23 "	46·0 "
Jawi	...	...	Daru	3 $\frac{1}{2}$ "	153 "	43·7 "
Luawa	...	...	Mende	29 acres	69 "	23·8 "

Chiefdom.				Town.	Number of Bushels Seed Rice reported as sown.	Reported Yields in Bushels.
Luawa	...	...	...	Kailahun	2 bushels	398 bushels
"	...	...	...	Giehun	2 "	110 "
"	...	...	...	Boma	2 "	160 "
"	...	...	...	Mafindo	3 "	417 "
"	...	...	...	Giema	2 "	58 "
"	...	...	...	Biwabu	1 $\frac{3}{8}$ "	166 "
"	...	...	...	Nyandehun	2 "	110 "
"	...	...	...	Dodo	2 "	101 "
"	...	...	...	Mano	2 "	72 "
Kisi Tungi	...	...	...	Buyedu	2 "	207 "
" Teng	...	...	...	Kangama	2 "	136 $\frac{1}{2}$ "
" "	...	...	...	Koindu	2 "	112 "
Kisi Kama	...	...	...	Dia	2 "	220 "
Upper Bambarra	...	...	...	Pendembu	$\frac{1}{2}$ bushel	5 $\frac{1}{2}$ "
"	...	...	...	Bomaru	1 "	59 "
Dia	...	...	...	Baiwalla	2 bushels	153 "
Penguia	...	...	...	Sandaru	2 "	150 "
"	...	...	...	Woroma	1 bushel	87 "

Regarding the success of these operations the Provincial Superintendent of Agriculture, Central Province, reports as follows :—

“The Temne method of swamp rice cultivation seems to be fairly well established in certain chiefdoms in Pendembu District, and the majority of chiefs who had experience of this method appear to have taken it up with enthusiasm. I understand from several chiefs that the surplus rice from last year's harvest was distributed for seed purposes to their various sub-chiefs and headmen.”

COCO-NUTS.

The planting of coco-nuts in the coastal belt of the Southern Province has progressed satisfactorily during the year. The work is in the hands of an agricultural assistant who has his headquarters in Bonthe, and of court messengers supplied by the three principal coco-nut districts—Bonthe, Sumbuya and Pujehun. Much of the credit for the good progress made is due to the energies of the political officers who have arranged for large supplies of seed nuts.

Reports on the plantations are encouraging. The following extract from a letter from the Honourable Provincial Commissioner, Southern Province, is quoted :—

“I have recently (July) made another inspection of these plantations and they are in a remarkably flourishing condition. At Dema the trees are 8 feet high and at Tagbel and round the Kittam estuaries many plantations have trees over 6 feet.”

The following table shows the numbers of coco-nuts planted out annually since the commencement of the planting scheme in 1923 :—

COCO-NUT PLANTING IN THE SOUTHERN PROVINCE DURING THE YEARS 1923-1926.

Year.	District.	Number of Coco-nut Trees planted.	Totals.
1923-4 ...	Pujehun	7,413	33,964
1925 ...	“	15,551	
1926 ...	“	11,000	
1923 ...	Sumbuya	2,015	
1924 ...	“	4,180	22,679
1925 ...	“	6,984	
1926 ...	“	9,500	
1923 ...	Sembehun	Nil	
1924 ...	“	2,549	2,549
1925 ...	“	Nil	
1926 ...	“	Nil	
1923 ...	Bonthe	4,401	
1924 ...	“	19,886	71,569
1925 ...	“	22,282	
1926 ...	“	25,000	
Total	130,761

IMPERIAL INSTITUTE REPORT ON A SAMPLE OF COPRA.

15. A sample of copra prepared in the Southern Province was sent to the Imperial Institute in February and the following extract from the report is given .—

“RESULTS OF EXAMINATION OF COPRA FROM THE SOUTHERN PROVINCE.

Moisture, per cent. ...	...	...	...	...	4.0
Oil in copra as received, per cent. ...	...	...	...	...	67.7
Oil in moisture free copra, per cent. ...	...	...	...	...	70.5
Acid value of extracted oil					
corresponding to ...	...	...	...	...	0.9
Free fatty acids (expressed as lauric acid), per cent. ...	...	...	...	...	0.3

"These results show that the copra contains a good percentage of oil, although the amount is slightly less than in the best commercial grades. The extracted oil was of the usual appearance and the percentage of free fatty acids was satisfactorily low. The percentage of moisture was a little too high, the maximum desirable being not more than 3 per cent.,"

Brokers estimated the value of the copra at £29 15s. 0d. per ton c.i.f. London, with Ceylon "f.m.s." copra at £30 7s. 6d. per ton c.i.f. United Kingdom ports, in bags. This is a satisfactory report and it was further stated that consignments of copra of similar character to the sample would be readily saleable in London.

COCOA.

16. Cocoa growing is spreading fairly rapidly, particularly in the Southern Province where an intensive campaign has been carried out by political officers during the past few years. Planting is practically out of Government control now in the Pujehun and Mano River districts and people are raising nurseries without persuasion. The Provincial Superintendent of Agriculture, Southern Province, reported that the amount of seed sown under the supervision of cocoa instructors in Mano River, Pujehun and Sumbuya districts exceeded 335,000 seeds.

The first of the plantations made under Government control are expected to come into bearing at the end of 1927.

The export of cocoa from Freetown and Sherbro for the year was 41 tons. The price paid to farmers reached 3½d. per lb. at Pujehun. A significant fact with regard to the trade is that Syrian traders are taking an increasing interest in this product. During the last quarter they purchased 20,000 lb. of cocoa at an average price of 3d. per lb. for resale to firms.

GINGER.

17. The exports of ginger for the year amounted to 55,265 cwt. valued at £72,019, as compared with 49,260 cwt. valued at £119,742 in 1925, an increase of 6,005 cwt. in quantity but a decrease of £47,723 in value.

An effort was made in February to induce the ginger growers in the Moyamba District to clean-peel their ginger, and Government made an arrangement with the Chamber of Commerce to purchase at Moyamba 100 tons of clean-peeled ginger of Grade "A" quality for a trial shipment to England and South Africa. The effort met with little success, however, only 14½ tons of Grade "A" ginger being purchased. The railway strike had a good deal to do with this result and, furthermore, the growers did not consider the premium offered for the higher grade sufficiently attractive.

It has been found from investigations made at the Imperial Institute that Sierra Leone ginger peelings are richer in the essential oil than is usually obtained and that the price paid for peelings is very much higher than is usually paid for Sierra Leone ginger. This is expected to prove an incentive to growers to peel their ginger.

The cultivation of ginger in the Northern Province has been further encouraged. The yield from the crop planted in 1925 was light, but this was to be expected as planting was unavoidably delayed until late in the season.

In Koinadugu District the whole of the crop was replanted and 10 cwt. of fresh sets distributed in Simiria Chiefdom. In Bombali District 315 cwt. of sets were sold to prospective growers; 16 cwt. were similarly distributed in Port Loko District. The crop thrived well and a good yield is expected early in 1927.

18. A sample of peeled ginger was sent to the Imperial Institute in January and the following report was received:—

"GINGER FROM SIERRA LEONE.

"The sample of ginger, which is the subject of this report, was forwarded to the Imperial Institute by the Commissioner of Lands and Forests, and is referred to in his letter No. C.L.F. 58/356/1925, dated 8th January, 1926.

"The sample was forwarded in continuation of previous investigations of Sierra Leone ginger at the Imperial Institute, and was stated to represent peeled ginger of Grade A of the present season's crop. It was desired that reports on its quality and value should be obtained.

"It was further stated that arrangements were being made in the Colony to prepare 100 tons of peeled ginger this season in order to test the markets."

“DESCRIPTION.

“The sample consisted of 20 lb. of unlimed peeled ginger, in good sound condition. It was partly in hands up to four inches long and partly in small pieces. The ginger was fairly plump, had a short, slightly fibrous fracture, and was cream coloured on the outside and pale yellow internally. It was of good appearance and quality and possessed a satisfactory aroma and pungency.”

“COMMERCIAL VALUE.

“The ginger was submitted to several merchants and brokers for their opinions regarding its quality and probable market value. All the firms consulted reported that the ginger was of good quality and that commercial consignments of similar material would be readily saleable in this country. There are however some difference of opinion as to the actual price likely to be obtained for shipments, and valuations were received ranging from 55s., to 67s. 6d., per cwt. c.i.f., with ordinary unpeeled African ginger at 45s. per cwt. c.i.f.

“One of the firms of merchants stated that peeled ginger from Sierra Leone had already been brought to their notice and that supplies had been offered to them at 65s. per cwt. c.i.f. They expressed the opinion that product had been satisfactorily peeled and would be readily saleable as a soft “cutting” ginger. It would be substituted to some extent by manufacturers for “cut” Cochin ginger, but this would only be possible in cases in which ginger of a lower quality could be used, since, however well it might be prepared, Sierra Leone ginger would not reach the quality of the Cochin variety. This firm recommended liming the hands, as is done in the case of “cut” Cochin ginger, and grading to a higher standard of size by excluding the smaller hands and pieces.

“Another firm of merchants reported that peeled ginger from Sierra Leone had previously been submitted to them and that they had ordered a trial shipment, which will enable them to bring it to the notice of all manufacturers likely to be interested in it.

“The price which the ginger will eventually realise cannot be stated with any degree of accuracy at present, as the grade is new to the market. Its real value will doubtless be ascertained by the sale of the consignments which are being prepared for the purpose.

REMARKS.

“This peeled Sierra Leone ginger has been well prepared and is of good quality. There is no doubt that shipments of such material would be readily saleable in the United Kingdom at prices considerably above that of ordinary unpeeled African ginger. If the ginger were limed and the larger hands were freed from the smaller hands and pieces, it would realise a still higher price, as the appearance of the products would then more closely resemble that of “cut” Cochin ginger.”

19. The following is the Imperial Institute report on a sample of ginger peelings:—

“REPORT ON GINGER PEELINGS FROM SIERRA LEONE.

“The sample of ginger peelings, which is the subject of this report, was forwarded for examination to the Imperial Institute by the Commissioner of Lands and Forests and is referred to in his letter No. C. L. F. 253/356/25, dated 1st February, 1926.

“It was desired to ascertain the quality and value of the peelings and the extent for the demand for such material in the United Kingdom.

“DESCRIPTION.

“The sample consisted of 51 lb. of thin, pale yellowish brown, dry, shrivelled peelings with very little of the interior of the ginger rhizomes attached to them.

“RESULTS OF EXAMINATION.

“The peelings were examined in order to determine the yields of essential oil and of extract.

“ESSENTIAL OIL.

“A portion of the peelings, after having been ground fairly finely, contained 10·1 per cent. of moisture and on distillation with steam yielded 4·0 per cent. of essential oil, equivalent to 4·4 per cent. on the moisture-free material. This yield is somewhat higher than is usually obtained from ginger cuttings, which generally furnish between 2 and 3 per cent. The oil was pale yellowish-brown and had a fairly good aroma.

"The constants of the oil are given in the following table in comparison with those recorded for commercial oil of ginger:—

	Present Sample of Oil.	Commercial Oil of Ginger.
Specific gravity at 15/15° C	0·881	0·874 to 0·886
Optical rotation O (D)	−43·75°	−25° to 50°
Refractive index n _D 20°	1·492	1·4885 to 1·4950
Acid value	1·5	0 to 2
Ester value	2·9	1 to 15
Ester value after acetylation	33·1	30 to 45
Solubility in 95 per cent. alcohol at 15° C	1 in 4 or more volumes.	Up to 7 volumes and more then not always clear.

"These results show that the oil obtained from these ginger peelings has the normal characters of oil of ginger.

"EXTRACT.

"On extracting the ground peelings with acetone and removing the solvent by distillation, a dark brown viscous extract was obtained, which had an intensely pungent taste and a good aroma. The yield of extract amounted to 12·5 per cent., equivalent to 13·9 per cent. on the moisture-free material. This yield is very satisfactory in comparison with that obtained from the East India cuttings usually employed for the purpose, which generally yield between 9 and 9·5 per cent. of extract.

"COMMERCIAL VALUE.

"Samples of the peelings were submitted to wholesale druggists, manufacturing chemists and essential oil distillers, and their observations may be summarised as follows:—

"The peelings would be saleable to manufacturing chemists for the preparation of extract (gingerine), or to distillers for the production of essential oil. For these purposes the material would have to compete with ginger cuttings now imported from India. None of the firms, however, was able to assign a definite value to the peelings or to furnish an estimate of the possible demand.

"One firm reported that the peelings have a higher yield of extract than East India (Calicut) cuttings, and that the extract was of excellent appearance and of paler colour than that obtained from the latter material. The flavour and aroma, however, were considered somewhat inferior to those of the extract from Calicut cuttings.

"Another firm expressed the opinion that the ginger peelings should realize about 15s per cwt. less than Calicut, which were then selling at 75s. per cwt. (May, 1926). They mentioned that the market for the cuttings was weak, that prices were falling and that the price mentioned should be regarded merely as an indication of the definite offer for a consignment, and suggested that, in the first place, a quantity of 10 to 20 cwt. should be forwarded in order that they might carry out a trial on a factory scale.

"REMARKS.

"The results of this investigation have shown that the ginger peelings from Sierra Leone give good yields of essential oil and extract, and that these products are of satisfactory quality. The favourable reports which have been received from the trade indicate that the peelings would probably find a good opening in the United Kingdom, but it is not possible to report definitely on the commercial value until consignments have been sent for trial on an industrial scale. It therefore seems desirable that a trial shipment of 10 to 20 cwt. should be forwarded in accordance with the offer of one of the firms consulted."

CASTOR.

20. Political officers purchased most of the 1925 crop at 2d. per lb. This was redistributed free as a further encouragement to the cultivation of the crop. It is estimated that something like half a ton of seed has been sown in the three provinces. It is hoped to be able to obtain a sufficient quantity of beans this year for a trial shipment to England. Political and agricultural officers are again buying the crop at 2d. per lb.

This crop will prove a remunerative one to the natives if planted on the rubbish heaps and waste lands around villages.

MAIZE.

21. The department continues to distribute seed of the South African varieties. In the Southern Province particularly, seed is now widely distributed.

COTTON.

22. The results of the trials with Allen long staple cotton in 1925 proved disappointing. Propaganda to encourage more extensive cultivation of the crop was therefore modified this year until further experimental work with this and other varieties had been carried out.

The experimental work has been carried out principally at Njala Experimental Farm and at Binkolo, Northern Province. A quantity of seed was issued free to chiefs willing to grow the crop in the Pendembu, Kono and Kenema districts. Altogether 1,500 lb. of seed was issued. Reports on the crop from the three districts are unsatisfactory. The crop was sown in August to September and was being harvested at the end of the year.

The results of the Binkolo and Njala experimental work, though not concluded at the end of the year, are given here.

BINKOLO EXPERIMENT.

23. The experiment was a repetition of that carried out in 1925 to 1926. The same plots were used and similar fertilizers were applied at the same rate.

The treatment of the plots was as follows :—

Plot	6a	$\frac{1}{4}$ acre	...	...	...	Sulphate of ammonia
"	6b	" "	...	...	...	Sulphate of ammonia, sulphate of potash and superphosphate
"	6c	" "	...	...	...	Lime
"	6d	" "	...	...	...	Lime, sulphate of ammonia, sulphate of potash and superphosphate
"	7	1 "	...	...	...	Control.

Lime was applied at the rate of one ton per acre and fertilizers at the rate of 2 cwt. per acre.

The following yields of seed cotton were obtained :—

Plot Number.	Actual Yield in lb.	Yield per Acre—lb.	Yield per Acre, 1925-1926, lb.
6a	$12\frac{1}{2}$	50	102
6b	32	128	194
6c	$31\frac{3}{4}$	127	112
6d	$72\frac{1}{4}$	289	258
7	56	56	77

Plot 6d, complete manure and lime plot, gave the highest yield, almost five times more than the control plot.

The conclusions arrived at were that the yield would have been considerably greater had the crop been sown earlier, say mid-August, when better vegetative growth would have been made, and had there been fewer failures amongst the seedlings when several inches high, due to depredations of crickets and termites and to the excessive rains of September.

NJALA EXPERIMENT.

24. Manurial and seasonal planting trials were arranged for with the variety Allen long staple. Owing, however, to the unfortunate flooding which occurred with the abnormal rise of the River Taia, these trials were a comparative failure. The plots required to be resown after flooding and seasonal planting trials were thereby rendered valueless. Certain plots received lime at half the 1925 rate, but no sulphate of ammonia was applied.

The results of the trials are as follows :—

Date of Sowing.	Manure.	1925.	1926.
Sown originally 15th July Resown 22nd September	Lime	360 lb.	71 lb.
	Lime and sulphate of ammonia	469 "	87 $\frac{3}{4}$ "
	Control	312 "	59 "
Sown originally 1st August Resown 22nd September	Lime	466 "	105 $\frac{1}{2}$ "
	Lime and sulphate of ammonia	448 "	110 $\frac{1}{2}$ "
	Control	355 "	75 "
Sown originally 15th Aug. Resown 22nd September	Lime	509 "	137 "
	Lime and sulphate of ammonia	580 "	148 $\frac{1}{2}$ "
	Control	372 "	112 $\frac{1}{2}$ "
Sown in 1926 on 23rd Sept. Sown in 1925 on 1st Sept.	Lime	675 "	167 "
	Lime and sulphate of ammonia	560 "	154 $\frac{1}{4}$ "
	Control	416 "	115 $\frac{1}{4}$ "

25. The result of the sales of the 1925 to 1926 cotton crop are here stated :—

The first quality Quande variety (2 bales) was sold at 6·75*d.* per lb. (pass on American futures); the second quality Quande (1 bale) sold at 4·75*d.* per lb. (200 points off American futures), while the mixed (1 bale) realized 6·50*d.* per lb. (25 points off American futures). The seven bales of Allen long staple, which were sold at a later date, realized 7·82*d.* per lb.

COFFEE.

26. It has been decided to encourage the cultivation of Robusta coffee in the Gbangbama District, Southern Province, and forty-three nurseries have already been made at the larger towns and villages. It appears that nurseries have suffered a good deal through flooding and lack of attention on the part of the owners.

27. In the Pujehun and Mano River districts, eastwards of the Wanje River, a good deal of Liberica coffee is grown and every encouragement is being given the people to increase this crop.

28. Exports of coffee in 1926 amounted to 61 cwt., 28 cwt. were exported from each of the ports of Mano Salija and Sulima and 5 cwt. from Freetown.

29. At each of the provincial experimental farms the various varieties of coffee are under trial.

EXPERIMENTAL STATIONS.

30. With the appointment of a Provincial Superintendent of Agriculture to each province, it has been found possible to open a number of experimental farms. These farms have been established at the Provincial Superintendents' headquarters at Magburaka, Northern Province, Pujehun, Southern Province, and at Bedu and Kainkordu in the Central Province, whilst in the Central Province another farm is being opened at the Provincial Superintendent's headquarters at Daru. In the Northern Province cotton trials have been conducted for the past two years at a small experimental farm at Binkolo.

The central experimental station where the principal trials are conducted is at Njala, the headquarters of the division.

NJALA EXPERIMENTAL STATION.

31. A Provincial Superintendent of Agriculture has been in charge of the farm continuously throughout the year.

32. A labour shortage was again this year experienced in the early months of the year and this, unfortunately, threw the work late. The late sowing of certain of the crops had an adverse effect on the yields.

PERMANENT PLANTATIONS.

33. No new plantations were made during the year. Cassia trees for shade purposes were planted in a plot on the north farm and on plot 3 on the south farm. *Stenophylla* coffee will be planted later in these plots.

ESTABLISHED PLANTATIONS.

34. *Oil-palm*.—The Nigerian oil-palm plot and the plots of the native varieties, henoi, kporli and kawei, have been handed over to the care of the Mycologist, who is now responsible for the work of investigation and recording.

35. *Limes*.—Manurial trials were carried out in the Dominica limes on the south farm. The following table gives the results of the trial :—

SECTION I.		SECTION II.	SECTION III
Month.	1 Cwt. Sulphate of Ammonia, 3 Cwt. Superphosphate, 4 Cwt. Potash.	24 Cwt. Lime.	Control (No manure).
January ...	3.5 bushels ¹	2.75 bushels	3.8 bushels
February ...	7.25 "	4.0 "	6.4 "
March ...	8.75 "	5.75 "	11.30 "
April ...	6.25 "	3.5 "	6.30 "
May ...	1.5 "	1.5 "	1.5 "
June ...	0	0	0
July ...	1.5 "	3.0 "	2.8 "
August ...	8.0 "	12.25 "	14.7 "
September ...	156.75 "	18.25 "	23.0 "
October ...	140.75 "	47.0 "	26.0 "
November ...	38.5 "	21.5 "	16.0 "
December ...	3.0 "	3.0 "	3.5 "
Total	375.75 bushels.	122.5 bushels.	115.3 bushels.

¹ These figures show bushels per 100 trees.

The yield of limes per acre for the past five years is as under :—

YIELD OF LIMES PER ACRE.

Year.	Ngiehun Plot. (Dominica Variety.)				
	Barrels.				
1922	271.00
1923	222.92
1924	118.20
1925	44.90
1926	105.90

The Sierra Leone variety of limes on the north farm yielded as follows :—

Month.	Sierra Leone Limes, Naiawama. 1.30 Acres. No manure : 262 Trees.				
	Bushels.				
January	39.00
February	7.50
March	54.00
April	92.25
May	42.00
June	8.50
July	26.25
August	86.00
September	113.50
October	113.00
November	82.50
December	16.00

The following are the yields per acre from the plot for the past five years :—

1922 ...	...	...	...	...	276.00 barrels
1923 ...	...	...	...	...	420.38 "
1924 ...	...	...	...	...	111.68 "
1925 ...	...	...	...	...	116.90 "
1926 ...	...	...	...	...	149.54 "

Note.—One barrel limes equals 3.5 bushels.

36. *Coffee*.—The following is a statement of the yields of coffee from the various plots :—

Plot No.	Area in Acres.	Farm.	Variety.	Yield in Fresh Cherries.
57	1.08	South	Canephora	364.50 lb.
58	.73	"	Robusta	609.56 "
9	—	North	Robusta	398.63 "
9	—	"	Arabica	20.75 "
9	—	"	Liberica (small)	161.38 "
9	—	"	Liberica (medium)	45.50 "
9	—	"	Liberica (large)	406.12 "

37. MANURIAL TRIALS ON STENOPHYLLA COFFEE.

Plot. No.	Area in Acres.	Farm.	Yield in Fresh Cherries per 100 Trees.	
			Manured.	Control.
3	.78	South	292 lb. 14 ozs.	120 lb. 6 ozs.

38. *Kola*.—The kola plots have been put under the care of the Entomologist, who is conducting experimental work against psyllid insects and other pests.

39. *Citrus*.—Late Valentia and Washington Navel oranges were planted out late in 1925. They are in a thriving condition.

ANNUAL CROPS.

40. Manurial experiments were conducted with rice, ginger, ground-nuts and cassava. The cotton experiments are referred to in a previous paragraph. The following tables of results of the trials are submitted by the Provincial Superintendent of Agriculture in charge of the experimental farm :—

RICE.

Manurial Treatment.	Yield in lb. per Acre.	
	1925.	1926.
Lime	582	212½
Pitstuff	372	254
Lime and pitstuff	438	278½
Ammonium sulphate	688½	312
Lime, pitstuff and ammonium sulphate	556	292
Lime, pitstuff, potash and superphosphate	452	337
Lime, pitstuff, potash, superphosphate and Ammonium sulphate	346	298
Control (no manure)	571½	282

GINGER.

Manurial Treatment.	Yield in lb. per Acre.	
	1925.	1926.
Lime	1695	1658
Pitstuff	3966	3784
Lime and pitstuff	3426	3331
Potash	2880	2832
Lime, pitstuff and potash	4365	2952
Lime, pitstuff, superphosphate, and sulphate of ammonia	3753	2400
Lime, pitstuff, potash, superphosphate and sulphate of ammonia	4596	2912
Control (no manure)	2352	1906

GROUND-NUTS.

Manurial Treatment.	Yield in lb. per Acre.	
	1925.	1926.
Lime	550	235
Superphosphate	536	232½
Lime and superphosphate	470	197½
Lime, superphosphate, potash and ammonium sulphate	428	180
Lime, superphosphate and potash	490	162½
Control (no manure)	500	130

CASSAVA.

Manurial Treatment.	Yield in lb. per Acre.
Lime	11,700
Pitstuff	12,788
Lime and pitstuff	10,470
Potash	10,610
Lime, pitstuff, and potash	12,392
Lime, pitstuff and sulphate of ammonia	10,452
Lime, pitstuff, potash, sulphate of ammonia and superphosphate	12,594
Control (no manure)	12,710

41. These trials were to a great extent ruined by flooding of the plots which occurred during the abnormal rise of the River Taia in September. The ground-nut crop was very seriously affected by the disease *Cercospora personata*.

42. *Efwatakala Pasture*.—The draught oxen have been grazed on this pasture and have shown a liking for the grass. The animals kept in a healthy condition.

MAGBURAKA EXPERIMENTAL FARM.

43. This station was opened early in the year when the property of the Soudan Mission was purchased by Government. The permanent buildings provided quarters for the Provincial Superintendent of Agriculture, Northern Province, and an office and store have been considerably renovated by the Public Works Department. Further repairs are still necessary.

A nursery has been made and plantations of oil-palms, kola and coffee have been laid down. Trials were conducted with seeds of a number of local and imported crops. This farm will be extended in 1927.

BEDU EXPERIMENTAL FARM.

44. Model plots of the following crops are in course of being laid down:—kola and cocoa, *Canephora* coffee, Robusta coffee, and oil-palm. Trials with annual crops—maize, cotton, sugar-cane, etc., are also being conducted.

KAINKORDU EXPERIMENTAL FARM.

45. Trials at this farm are on the lines of those at Bedu.

PUJEHUN EXPERIMENTAL FARM.

46. The farm was opened in March and three acres of land were planted to maize, yams and pigeon-pea. The farm has since been extended to six acres. Plots of coffee (Liberian and Robusta), cocoa, grape fruit and kola will be laid down.

ZIMI MODEL PLANTATION.

47. This small farm was under the charge of an agricultural assistant until March. Since then the work has been supervised by the District Commissioner. The crops under cultivation are cocoa, Liberica coffee and sisal.

AGRICULTURAL INSTRUCTION.

48. The Agricultural Instructor Mr. Edwards was in charge throughout the session from January to October.

There were several changes amongst the apprentices during the early part of the first term, and the total number was brought up to twenty-four, divided into first and second year students.

Second year students have now completed a detailed study of most of the more important crops of the country and the principles studied in the classroom have been applied in the farm. A botanical study of these crop plants was also carried out and a course in elementary agricultural chemistry was continued.

The Instructor reports favourably on the progress made by the majority of his students. A good deal of important work has been undertaken on the farm plots and it is gratifying to note that the work has been well done.

METEOROLOGICAL.

49. The statistics for the various stations in the Colony and Protectorate are set forth in Appendix I attached hereto. Appendix II gives the monthly rainfall for the same stations for the past ten years.

I have the honour to be,

SIR,

Your obedient servant,

J. W. D. FISHER,

Acting Director of Agriculture.

APPENDIX I.

METEOROLOGICAL DATA, 1926.

BATKANU.

Month.	SHADE.		Total Rain- fall for Month.
	Maxi- mum, 5 p.m.	Mini- mum, 5 p.m.	
January	87·65	68·42	...
February	99·61	68·50	...
March	101·51	70·74	...
April	101·03	72·10	·93
May	96·55	72·03	9·48
June	89·30	71·30	15·70
July	85·74	71·71	16·89
August	85·64	70·90	19·95
September	88·63	70·73	13·63
October	89·55	68·97	12·72
November	89·57	71·44	7·34
December	90·26	67·39	...

Bo.

MONTH.	SHADE.		Total Rain- fall for Month
	Maxi- mum, 5 p.m.	Mini- mum, 5 p.m.	
January	93·13	67·29	...
February	97·00	68·00	...
March	95·55	72·26	3·76
April	94·07	73·00	8·38
May	90·97	72·55	8·10
June	87·83	71·93	12·32
July	85·77	68·03	13·85
August	85·35	67·77	26·04
September	84·73	67·13	17·56
October	87·23	67·81	15·13
November	87·43	70·47	9·45
December	88·06	66·26	·18

BONTHE.

January	89·68	68·10	...
February	92·25	68·18	...
March	94·35	71·90	1·80
April	91·53	73·40	6·02
May	90·20	73·70	6·59
June	88·60	71·50	30·44
July	86·19	71·19	30·71
August	84·74	70·13	56·26
September	84·63	72·47	16·16
October	87·39	72·68	13·96
November	88·87	73·00	4·96
December	89·52	73·52	·40

DARC.

January	89·74	69·84	...
February	96·57	66·11	...
March	98·00	70·23	2·19
April	93·80	72·80	5·72
May	93·61	72·55	13·61
June	88·60	71·80	11·22
July	84·93	71·19	16·83
August	85·23	71·42	15·14
September	88·13	71·57	8·83
October	90·10	70·94	12·59
November	88·90	70·80	8·14
December	88·58	67·97	·30

KABALA.

MONTH.	SHADE.		Total Rain- fall for Month	
	Maxi- mum, 5 p.m.	Mini- mum, 5 p.m.		
January	...	90·64	61·03	·11
February	..	96·29	61·36	...
March	...	96·84	68·61	1·17
April	...	94·43	70·40	1·66
May	...	91·52	69·68	6·19
June	...	86·33	68·77	10·05
July	...	83·13	67·52	13·68
August	...	82·58	67·45	17·38
September	...	84·47	66·90	18·97
October	...	85·55	66·00	10·45
November	...	85·27	66·30	5·76
December	...	86·42	61·06	·40

KISSY.

MONTH.	SHADE.		Total Rain- fall for Month	
	Maxi- mum, 5 p.m.	Mini- mum, 5 p.m.		
January	...	86·19	70·29	...
February	...	89·57	72·14	...
March	...	92·09	74·61	·32
April	...	89·80	73·87	4·80
May	...	90·55	73·39	8·47
June	...	87·00	74·07	27·95
July	...	83·20	72·94	23·00
August	...	83·65	72·97	31·08
September	...	84·97	73·03	19·99
October	...	86·94	71·29	9·19
November	...	86·17	69·50	4·65
December	...	87·42	70·03	...

MAKENI.

January	...	92·90	66·51	·02
February	...	95·00	66·79	...
March ...	...	96·87	73·06	·95
April ...	...	95·97	74·87	3·87
May ...	...	92·68	73·48	13·60
June ...	...	88·33	73·03	18·04
July ...	...	85·90	72·71	22·35
August ...	...	84·61	72·45	26·38
September	...	86·87	72·33	19·63
October ...	...	88·39	71·13	14·39
November	...	87·90	72·67	9·55
December	...	88·29	68·58	·12

MOYAMBA.

January	...	93·00	68·35	·08
February	...	96·92	67·71	...
March ...	...	95·03	73·51	2·58
April ...	...	93·16	73·33	3·63
May ...	...	93·94	71·84	5·59
June ...	...	89·13	72·46	13·24
July ...	...	83·77	71·68	9·35
August ...	...	84·87	70·84	20·99
September	...	89·13	71·00	19·38
October	...	91·23	70·52	11·03
November	...	90·80	71·40	4·26
December	...	91·40	69·20	1·40

PUJEHUN.

MONTH.	SHADE.		Total Rain- fall for Month.
	Maxi- mum, 5 p.m.	Mini- mum, 5 p.m.	
January ...	91·64	68·93	·13
February ...	95·29	72·04	...
March ...	95·61	73·16	1·54
April ...	94·30	72·33	9·20
May ...	94·48	73·45	13·70
June ...	87·87	72·50	24·40
July ...	87·16	72·93	20·50
August ...	87·16	72·45	33·77
September ...	87·37	72·87	16·20
October ...	94·68	72·71	7·80
November ...	95·87	73·87	4·50
December ...	95·36	73·68	·40

NJALA.

MONTH.	SHADE.		Total Rain- fall for Month.
	Maxi- mum, 5 p.m.	Mini- mum, 5 p.m.	
January ...	91·87	64·41	1·1
February ...	97·53	66·17	...
March ...	98·29	70·13	4·41
April ...	97·23	71·93	5·92
May ...	93·39	72·58	6·74
June ...	87·87	73·03	17·57
July ...	88·32	71·10	15·82
August ...	87·94	70·10	19·47
September ...	89·30	69·77	16·63
October ...	92·00	66·06	12·09
November ...	92·40	65·80	5·34
December ...	90·58	66·90	1·46

Appendix II.

RAINFALL DATA, 1917-1926.

BATKANU.

MONTH.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	Average.
January	...	...	...	...	...	...	...	·30	...	...	·030
February	2·28	...	·25	...	...	...	·05	1·00	·07	...	·365
March	·74	2·95	4·09	·55	·25	·02	1·22	..	1·56	...	1·138
April	1·39	4·44	4·41	2·51	2·63	6·13	6·74	6·10	3·58	·93	3·886
May	8·23	12·81	12·34	5·37	12·58	12·62	6·71	13·70	10·27	9·48	10·411
June	12·32	15·78	18·87	16·42	11·90	13·95	18·10	13·30	12·79	15·70	14·913
July	19·05	16·20	22·39	19·72	23·60	31·63	22·60	25·85	11·69	16·89	20·962
August	30·10	9·39	27·48	13·51	33·07	26·06	22·50	18·60	17·02	19·95	21·768
September	22·35	13·37	16·85	18·35	15·00	18·98	17·60	25·20	19·24	13·63	18·057
October	17·00	15·61	12·04	15·14	19·03	17·71	15·05	17·40	20·20	12·72	16·190
November	11·00	9·93	4·42	10·69	15·93	14·97	9·65	10·52	14·00	7·34	10·845
December	3·20	1·72	·50	...	...	4·10	1·90	...	·65	...	1·207
Total	127·66	102·20	123·64	102·26	133·99	146·17	122·12	131·97	111·07	96·64	119·772

RO.

Month.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	Average.
January	...	·18	...	...	...	·05	·19	·33	...	...	·135
February	...	2·20	1·02	...	1·22	...	1·28	1·26	·38	...	·736
March	...	2·90	2·49	4·84	1·90	·28	2·05	3·45	5·26	3·76	2·971
April	...	2·66	5·47	6·00	9·15	7·29	9·67	9·35	7·05	8·38	7·702
May	...	6·20	13·01	14·11	7·39	12·92	7·48	6·50	7·05	8·10	9·259
June	...	12·44	17·43	15·90	20·70	13·88	11·39	18·78	15·66	12·32	14·532
July	...	13·94	16·72	23·86	16·63	9·13	19·66	18·42	18·76	13·85	16·178
August	...	17·84	25·19	22·97	27·02	16·16	12·37	19·02	26·87	26·04	20·825
September	...	20·19	37·36	35·01	16·77	25·81	16·82	20·17	15·20	17·56	23·075
October	...	12·86	16·88	13·84	13·85	17·86	17·34	15·14	10·65	15·13	15·045
November	...	9·78	...	12·02	7·35	9·39	7·72	11·41	9·48	9·45	8·059
December	...	2·37	3·50	...	1·41	3·66	·51	·75	·83	·18	1·386
Total	...	103·56	139·07	148·55	123·39	116·43	106·48	124·58	117·19	114·77	119·903

BONTHE.

Month.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	Average.
January	... 45	10	...	02	...	62	02	10	...	...	071
February	... 1.89	...	12	22	1.75	...	54	66	...	...	518
March	... 86	3.48	3.90	1.12	95	...	2.07	2.70	1.72	1.80	1.860
April	... 1.00	5.37	5.02	4.16	2.81	5.25	4.78	4.24	5.47	6.02	4.402
May	... 8.62	9.97	13.90	9.03	7.44	7.20	6.38	6.96	9.21	6.59	8.530
June	... 10.32	24.96	36.30	15.19	13.79	23.40	27.07	20.46	26.76	30.44	22.869
July	... 20.17	22.17	15.58	30.34	23.84	20.08	23.33	34.86	45.79	30.71	26.687
August	... 43.54	17.57	26.42	12.71	26.51	24.90	15.47	29.78	22.73	56.26	27.589
September	... 26.73	25.86	27.68	31.87	19.27	29.74	22.74	20.99	23.70	16.16	24.474
October	... 9.91	8.17	12.79	9.89	8.51	15.78	17.72	11.08	7.01	13.96	11.482
November	... 7.36	5.41	3.66	9.50	8.44	14.00	8.66	6.82	3.02	4.96	7.183
December	... 2.17	92	2.10	56	2.71	3.45	06	02	41	40	1.280
Total	... 133.02	123.98	147.47	124.61	116.02	143.82	128.74	138.67	145.82	167.30	136.945

DARU.

Month.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	Average.
January	20	60	...	21	...	...	...	159	...	...	260
February	217	46	60	258	332	36	46	160	178	..	1303
March	106	894	684	270	346	154	186	245	328	219	3432
April	707	1855	722	497	576	1080	611	874	772	572	8266
May	520	1299	885	931	708	1000	1311	814	1500	1361	10329
June	1326	1178	1645	1241	1400	1247	1306	1133	1168	1122	12766
July	1332	992	753	758	711	1158	1800	1360	859	1683	11466
August	1785	504	1178	960	1226	1111	805	837	1100	1514	11020
September	1912	1174	2036	1235	1344	1433	2537	1474	1396	883	15424
October	660	1003	1447	2001	1244	1558	975	1945	909	1259	13001
November	1355	955	677	790	611	976	636	1066	1286	814	9166
December	700	130	41	55	183	417	76	170	10	30	1782
Total	10640	10090	10098	9017	8681	10170	10319	10237	9506	9457	98215

KABALA.

47

MONTH.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	Average.
January	30	...	32	...	11	133
February	115	...	...	285	77	...	756
March	...	553	180	115	95	50	300	31	391	117	1857
April	...	471	335	408	450	700	483	220	146	166	3651
May	...	1503	1360	865	686	497	544	939	908	619	8576
June	...	659	2241	1685	1057	1160	1565	1380	1579	1005	13624
July	...	1227	1325	1450	1458	1130	1408	1261	1067	1368	13300
August	...	1117	1380	802	1565	1520	1190	1491	1121	1738	13540
September	...	1073	1823	1013	1724	2314	1824	1710	1431	1897	16175
October	...	1199	1028	980	960	2730	1283	1142	1803	1045	13648
November	...	427	500	400	510	910	1091	709	576	576	6710
December	...	300	205	...	...	150	156	...	108	40	1058
Total	...	8529	10377	7718	8620	11191	9844	9200	9207	8582	93028

KISSY.

MONTH.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	Average.
January	...	·82	...	...	...	...	...	·11	...	...	·093
February	·08	·08	...	1·17	·84	·16	...	·260
March	...	1·69	6·06	...	·32	...	·27	2·47	·86	·32	1·199
April	...	4·18	2·00	·84	1·44	4·52	6·25	2·25	2·38	4·80	3·036
May	...	8·03	7·31	4·98	7·75	4·53	8·55	7·16	6·10	8·47	7·130
June	...	7·85	4·60	14·94	11·76	18·42	15·21	22·20	13·59	27·95	15·182
July	...	17·72	24·96	44·63	15·08	42·01	31·08	31·90	24·82	23·00	27·695
August	...	33·95	24·64	8·73	47·77	32·53	20·74	33·66	42·38	31·08	29·528
September	...	24·70	19·31	23·74	19·64	29·28	20·92	27·07	23·70	19·99	22·579
October	...	4·08	3·73	8·06	6·85	9·33	17·90	9·85	13·40	9·19	9·459
November	...	8·18	3·32	2·67	9·26	7·84	5·00	5·01	6·65	4·65	5·585
December	...	1·38	...	...	2·40	1·79	·28	...	·17	...	·705
Total	...	107·86	95·93	108·67	122·35	150·25	127·37	142·52	134·21	129·45	122·451

MOYAMBA.

49

MONTH.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	Average.
January	...	1.08	.99	.06	1.85	...	.13	.08	...	.08	.463
February	...	1.43	...	.53	...	...	.61	.11	3.32	...	.709
March75	3.27	2.19	.83	.72	1.64	.72	2.61	2.58	1.583
April	...	4.51	4.85	4.41	2.54	3.01	2.88	3.10	4.79	3.63	3.752
May	...	3.90	7.32	11.09	10.46	9.39	9.58	5.39	13.35	5.59	8.340
June	...	9.83	14.22	9.13	15.58	10.46	12.06	25.56	13.91	13.24	13.353
July	...	14.85	12.28	13.32	40.55	16.79	16.29	21.26	17.80	9.35	17.530
August	...	26.49	12.09	18.82	11.50	19.01	20.11	20.42	24.50	20.99	20.469
September	...	15.73	11.39	15.61	70.28	19.35	18.58	18.09	13.19	19.38	21.717
October	...	13.49	9.77	13.48	16.34	11.02	15.24	15.63	13.30	11.03	13.056
November	...	7.21	6.71	5.21	8.73	8.26	7.99	2.97	6.99	4.26	6.771
December	...	1.98	.18	.73	...	3.33	2.79	.42	.75	1.40	1.223
Total	...	101.25	83.07	94.58	178.66	102.71	101.47	114.03	114.51	91.53	108.966

NJALA.

MONTH.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	Average.
January	·60	1·11	...	...	...	...	·02	·50	...	1·10	·333
February	2·64	...	...	·09	2·39	...	·05	...	·62	...	·578
March	1·29	9·39	3·46	3·09	2·34	·87	5·09	1·68	1·97	4·41	3·359
April	2·33	7·57	7·40	3·57	6·36	4·50	4·42	6·57	4·64	5·92	5·328
May	5·01	8·71	9·94	6·65	8·15	12·71	8·01	5·83	10·66	6·74	8·241
June...	11·31	8·32	13·41	8·05	12·98	13·25	12·27	13·67	11·27	17·57	12·210
July ...	12·14	11·05	12·60	21·75	10·66	16·65	17·79	20·69	16·23	15·82	15·538
August	21·17	12·00	18·53	9·60	24·20	15·87	13·47	16·74	24·34	19·47	17·539
September	19·83	14·04	19·02	18·68	12·95	21·58	20·40	25·23	16·56	16·63	18·492
October	15·79	10·92	9·38	13·22	13·43	14·87	21·36	14·08	13·05	12·09	13·819
November	8·46	8·98	8·34	8·62	7·42	7·92	5·55	9·13	13·01	5·34	8·277
December	1·54	2·23	1·05	·35	2·18	2·09	1·64	2·02	·87	1·46	1·543
Total	102·11	94·32	103·13	93·67	103·06	110·31	110·07	116·14	113·22	103·55	105·257

PART V.

12th February, 1927.

TO THE DIRECTOR OF AGRICULTURE.

Sir,

I have the honour to submit a report on the work done in connexion with the training of the agricultural apprentices during the year 1926.

NUMBER OF APPRENTICES, NEW APPRENTICES, DISMISSALS, ETC.

2. At the beginning of the year the number of apprentices was twenty-three. Of these two proved to be unsatisfactory, one was dismissed, and the other resigned. Apprentice Campbell was dismissed on 31st March, and apprentice Kapuwah resigned on the same date. Apprentice Deen was invalidated out of the service on 8th July. Apprentice Margai was appointed a sub-inspector of produce on 24th April, and therefore relinquished his training as an agricultural apprentice after having served nine months twenty-two days of his apprenticeship. These vacancies were filled during the year, and the number of apprentices was increased to twenty-four. The new appointments were made as follows:—

Kposowa	...	...	16th March, 1926
Sundiana	...	...	8th April, 1926
Gray	...	...	17th April, 1926
Davies	...	...	1st June, 1926
Bright	...	...	1st September, 1926

In addition J. Mava was sent by the United Methodist Mission by arrangement with the Honourable Commissioner of Lands and Forests to receive a training in agricultural science. This student commenced his work on 24th January, 1926.

STAFF.

3. The staff under me in this section of the Division of Agriculture is a laboratory assistant, a sergeant drill instructor, and one labourer acting as a laboratory boy.

WORK COVERED.

4. During the session the course was continued on the same lines as previously. Theoretical and practical work were carried out in the three main directions of agriculture, agricultural botany, and agricultural chemistry. The two latter sections are intended to supply (1) a training in elementary natural science, and (2) a means of dealing with certain subjects closely connected with agriculture, as the study of plant diseases, elementary soil, chemistry, etc.

5. The apprentices were divided into groups I and II, being the first and second year students respectively. During the first year the course deals with the general principles of agriculture, and an elementary study of botany and chemistry, in which the examples are taken as far as possible from subjects connected with agriculture. In the second year the agriculture consists of a detailed study of the crops of Sierra Leone. In connexion with this work most of the important crops are grown on the Model Farm, and the principles studied in the lecture room are applied on the farm. In agricultural botany the second year students undertake a detailed botanical study of the chief crop plants of the country, and also an elementary study of the internal anatomy of plants. This latter section is intended partly as a preparation for the third year work on plant diseases. The course in elementary agricultural chemistry is continued throughout the year. In the various sections of the above work practical demonstrations have been carried out in the laboratory. In this connexion it will be of great advantage when the water supply is available, and a sink can be installed. This has been a long felt want.

MODEL FARM.

6. During the year the apprentices' farm has been kept in very good condition. There are now twenty-three $\frac{1}{4}$ -acre plots which are cultivated by individual apprentices, and five larger experimental plots. There is also a $\frac{1}{4}$ -acre plot devoted to the production of vegetables for the mess. The whole farm at present covers an area of 8.5 acres. On the $\frac{1}{4}$ -acre plots rotations are being tested, but the work is confined to crops of proved value in Sierra Leone. An attempt is being made to introduce permanent farming as against the shifting farming employed by the natives, and this attempt is being carried out by the use of rotations of crops, the application of pit manure made from brushings and other waste vegetable material, and careful cultivation—all methods within the reach of the natives of the country. Up to the present

a number of these rotation experiments are giving promise of success, but it is too soon to draw very definite conclusions. Two further experiments were carried out during the year to test drilled rice against broadcast, to confirm the results obtained on one plot the previous year. Both experiments resulted in favour of drilled rice, but on account of the extra labour involved in sowing, although this is balanced to some extent by ease in weeding, I do not think there is a very great practical advantage in drilled rice at present unless some form of hand drill could be introduced, especially as it would necessitate the removal of stumps from the land at the outset.

RESULTS.

—	Plot.	Plot Area.	Apprentice.	Weight of Seed Sown.	Net Yield.	Yield per Acre.
Drilled	11 A	$\frac{1}{16}$ acre	Smith	4 lb.	93 lb.	1,488 lb.
Broadcast	"	"	"	4 "	84 "	1,344 "
Drilled	22 B	"	Lahai	3 "	64 "	1,024 "
Broadcast	"	"	"	3 "	52 "	832 "

7. Ground-nuts planted on ridges have been compared with those planted on the flat in the native way. As shown below, the results are in favour of the cultivation on ridges.

RESULTS.

—	Plot.	Plot Area.	Apprentice.	Weight of Seed Sown.	Net Yield.	Yield per Acre.	Remarks.
Ridged	16 B	$\frac{1}{16}$ acre	Koroma	3 lb.	80 lb.	1,280 lb.	
Ridged	" "	"	"	3 "	59 "	944 "	Affected by flood.
Flat	15 "	$\frac{1}{8}$ "	French	5 "	147 "	1,176 "	
Ridged	19 "	$\frac{1}{16}$ "	Kongoh	3 "	79 "	1,264 "	
Flat	19 "	" "	"	3 "	71 "	1,136 "	
Ridged	17 "	" "	Gamanga	9 "	1 "	16 "	Late sown
Flat	17 "	" "	"	9 "	1 lb. 12 ozs.	28 "	two sowings.

8. Harvesting is at present in progress, and the yields up to date are as shown at end of report.

LARGER EXPERIMENTAL PLOTS.

9. In conjunction with the work that is being done on the selection of Quande cotton, an acre of land divided into thirds is being used to test a rotation designed for cotton growing.

QUANDE COTTON PLOTS.

10. During 1926 two plots of $\frac{1}{3}$ and $\frac{1}{4}$ acre respectively were used for the selection of this cotton, which work was commenced early in 1925. The harvesting is at present in progress, and the crop shows distinct improvement.

SESSIONAL EXAMINATION.

11. The sessional examination was held on the 21st, 22nd, and 23rd of September and the 10th of October. Papers were set in the various branches of the work for each group of apprentices. In each paper questions were included from an external examiner. These examiners were, in the cases of agriculture, agricultural botany and agricultural chemistry, respectively, the Director of Agriculture, the Mycologist, and the Assistant Agricultural Chemist. In the practical examination on the farm, assistance was given by Mr. P. J. Moss, Provincial Superintendent of Agriculture, who acted as external examiner. The papers were afterwards forwarded to the external examiners for any recommendations as to alterations in the marking and grading, etc.

12. The results of the examination show good progress. The marks are better and there is an increase in the number of passes (over 50 per cent. marks) in all papers except Group I (second year) agricultural botany and chemistry. The botany paper especially was a somewhat difficult one. The results of the Group I agriculture examinations were particularly encouraging, as of the ten students in this group there was only one failure in the theory paper, and in the practical examination no failures.

13. During the year it became evident that there were three or four apprentices in Group II (second year) who had an inferior educational grounding and were not capable of profiting by the instruction to the same extent as the others. It will probably be necessary to give these a longer period of training in the first year work. In this connexion I am of opinion that candidates for apprenticeship should be given a much more thorough examination as to their elementary education than they have received in the past. It would be suggestive that they should be examined by the Agricultural Instructor before being finally appointed.

PRIZES.

14. The Honourable the Commissioner of Lands and Forests offered first, second, and third prizes, consisting of £3, £2, and £1, for the best kept apprentices plots during 1925 taking into consideration cultivation, improvement of soil, yields, etc. The decision was made, on 30th April after the harvesting had been completed, and the winners were as follows:—

1st Farma.	2nd Kai Tongi and Bull.
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15. The Honourable the Commissioner of Lands and Forests has kindly renewed his offer of prizes for 1926. In addition to the above the Director of Agriculture has expressed his intention of offering a prize for the highest place in the agriculture examination (theoretical and practical). This place was gained by apprentice Kai Tongi. The Agricultural Instructor has also presented a prize for the highest total mark in all branches of the sessional examination. This was won by apprentice Kangaju.

PHYSICAL TRAINING AND DRILL.

16. The course of physical training and drill under the instruction of the Sergeant Drill Instructor was continued throughout the year, and has had a marked beneficial effect upon the apprentices, both physically and in general smartness.

SPORTS.

17. The apprentices have continued to show a keen interest in games. At the beginning of the year the sports club was reorganized and thrown open to all members of the staff at Njala. With few exceptions it was found that very little interest was shown by members other than the apprentices, and as some of the officials did not show sufficient interest to carry out their duties, this arrangement was not found very satisfactory. I have therefore suggested that during 1927 the club shall be run by the apprentices.

LIBRARY.

18. Good use has been made of the library during the year by the apprentices, and the senior boys of Njala School have also been permitted to use it. The collection of books, pamphlets, etc., is as yet small, and not very suitable. I have requested that the publications of the agricultural and forestry departments of the other West Coast colonies should be obtained for the library.

QUARTERS.

19. Repairs to the quarters were carried out during the year, and three new houses were constructed. There are now six houses with four rooms and a large central room in each. The houses are inspected daily to see that they are kept clean.

MESS.

20. The mess was also completed in the early part of the year, furniture arrived at the end of February, and the building was put into use in March. It consists of a large room to which are attached two smaller rooms, one used as a store, and the other for serving up the food. An inspection is made daily as in the case of quarters. The provision of a mess has greatly facilitated the keeping of the quarters clean.

SENIOR BOYS OF NJALA SCHOOL.

21. The Sixth Form of the school attended lectures in elementary botany and nature study together with group II apprentices. In the latter part of the session instruction in theoretical agriculture was commenced. The lectures and demonstrations were carried out on the Model Farm, and wherever possible concrete examples were used to illustrate points discussed.

The progress of these senior boys was slow owing to the very elementary nature of their general education. One boy showed much more interest in his work than the others, and made good progress.

PROGRESS.

22. The apprentices, with few exceptions, made good progress in their work during the year.

YIELDS UP TO DATE ON MODEL FARM.

23. It will be observed that the yields of ginger are an improvement on the 1925-26 crop and that some of them come up to the best of the West Indian yields. This improvement is chiefly due to manuring with waste vegetable matter prepared in pits, and this would appear to show that, given careful cultivation and a supply of pit manure, as good yields may be expected in Sierra Leone as in the countries above mentioned. Particularly as the best yield (6,148 lb. fresh rhizomes, per acre) was obtained by following out a West Indian method of trenching, placing manure in the trenches, ridging, and planting on the ridges.

Plot Number.	Crop.	Apprentice.	Yield per Acre.	Remarks.
4 A	Maize	M. Farmer	808 lb.	
10 "	"	H. Pokie	400 "	
3 "	"	G. C. Taylor	344 "	
2 "	Guinea-corn	S. Bull	80 "	
5 "	"	J. Jamina	272 "	
6 B	"	M. J. Kangaju	23 " 8 ozs.	
12 A	"	A. E. Thorpe	488 "	
" B	"	"	416 "	
13 B	Sugar-cane	K. Tongi	21,600 "	
7 "	Benniseed	E. Wilson	8 "	
20 "	Chinese yams	S. Bundeh	12,896 "	
9 "	Ginger	B. Konjoh	1,668 "	
5 "	"	J. Jamina	6,148 "	
17 A	"	S. Gamanga	4,360 "	
6 "	"	M. J. Kangaju	3,830 " 8 ozs.	
21 "	"	M. G. Kposowa	2,176 "	
16 B	Ground-nuts	H. Koroma	1,280 "	
" "	"	"	944 "	Affected by flood.
15 "	"	R. E. V. French	1,176 "	
19 "	"	N. Koungoh	1,336 "	
" "	"	"	1,264 "	
17 "	"	S. Gamanga	28 " 16 "	Late sown : 2 sowings.
" B	Rice	"	1,592 "	
9 A	"	B. Konjoh	880 "	
" "	"	"	1,104 "	
8 B	"	A. Sundiama	1,088 "	
" "	"	"	1,024 "	
22 "	"	J. Lahai	1,024 "	
" "	"	"	832 "	
11 A	"	L. Smith	1,488 "	
" "	"	"	1,344 "	
18 B	Tomatoes	K. Kanja	2,866 "	
7 A	"	E. Wilson	200 "	
7 B	"	"	160 "	

I have the honour to be,

Sir,

Your obedient servant,

D. C. EDWARDS,

Agricultural Instructor.

PART VI.

LANDS AND FORESTS DEPARTMENT,

4th April, 1927.

SIR,

I have the honour to submit the annual report on the Division of Forests for the year 1926.

EXAMINATION OF FORESTS.

2. A preliminary survey of the forests on the slopes of the Loma Mountains was carried out. This mountain mass covers an area of over 150 square miles and rises to a height of over 6,000 feet. Except for the peaks and bare outcrops, the mountains are clothed with trees, most of which are of high forest types. Many streams, supplying a large number of towns and villages, have their source here, and it is proposed to reserve this tract as a "protection forest." The maintenance of the existing reserves and restricted areas has been continued. The boundaries of all reserves have been regularly patrolled and no serious infringement or damage has been reported.

CONSTITUTION OF RESERVES.

3. Owing to shortage of staff it has been possible to do but very little reservation work. In the Eastern Circle a commencement was made with the demarcation of the Gori Hills Reserve. In the Northern Circle the demarcation of the Tama Forest Reserve was brought to a conclusion, though it has not yet been possible for the Reserve Settlement Court to sit and for this reserve to be legally constituted. The area is approximately 66 square miles. In the Southern Circle the position with regard to the proposed Gola North Reserve is practically the same, though a request has now been received from the Tribal Authorities of Gowra Chiefdom for the reservation of that portion of the forests lying within the chiefdom. When the Reserve Settlement Commissioner has held his enquiry, it should be possible to proceed with the work of demarcation and to bring it to an early conclusion.

The list of legally constituted reserves and restricted areas remains as set forth in the annual report for 1925, no additions having been made during the year under review.

PLANTATIONS.

4. The plantations in the Kessewe Hills Reserve and the Kambui Hills have been kept up. A small plantation of *Anisophyllea laurina* was commenced in the Government Reservation area at Makeni. Seedlings of a few indigenous and exotic species were raised at Kenema, Gorahun and Makeni.

OIL-PALM INVESTIGATIONS.

5. Investigation into the distribution and yields of the different varieties of the oil-palm (*Elais guineensis*), formed an important part of the work of the division. Five-acre plots of natural palms were selected near three circle headquarters. These plots were cleared of undergrowth and the palms thinned out where necessary to a density of not more than 64 per acre. Each palm was numbered and the fruit from each harvested as it ripened, record being kept of the date of bearing and of the weight of fruit. In addition ten palms of each variety available were selected near three of the circle headquarters, and the number of ripe heads of fruit borne recorded. By these means it is hoped to obtain definite and accurate statistics as to the value of the different varieties of palm and of the effect of cultivation. The chief difficulty met with is to arrange for continuous European supervision, as it is only with such supervision that accurate results can be expected. The oil-palm nursery formed at Mabang in 1925 has borne a satisfactory crop of seedlings of the variety "Henoi," and a still larger area was sown with seed of this variety during the year. A survey of the proposed planting area was made. At Gorahun in the Southern Circle an effort was made to propagate the thin-shelled variety "Tugboi." A nursery was formed in which special preventive measures were taken against insect attack. Germination was at first very unpromising, but had improved by the close of the year.

RUBBER EXPLOITATION.

6. On the recovery last year in the price of rubber, it was decided to work the plantation of Para laid down at Kenema in 1912-13. A satisfactory yield of rubber of good quality was obtained. The area planted, however, is small and unless the recent fall in the market price of this commodity proves to be only temporary, it is doubtful whether it will continue to be a remunerative undertaking for Government.

COLLECTION OF SPECIMENS.

7. (a) *Timber*.—Collections were made for the Canadian National Exhibition, the British Industries Fair and the School of Forestry, Auckland, New Zealand.

(b) *Herbarium*.—Additions were made to the herbarium and material sent to Kew and Oxford for identification. Mr. F. C. Deighton, Mycologist of this department put in much time and labour in herbarium work.

STAFF.

8. The writer returned from vacation leave on 16th January and acted as Commissioner of Lands and Forests from 12th May until the end of the year. The Senior Assistant Conservator, Mr. E. Macdonald, M.C., acted as Conservator from 1st to 15th January and from 12th May to 1st September. Assistant Conservator Mr. D. G. Thomas returned from leave on 2nd January and acted as Conservator from 1st September to the end of the year. Assistant Conservator Mr. A. Burns served from 16th January to 19th November when he proceeded on leave. The staff was augmented by the appointment of Assistant Conservator Mr. J. C. Mallam, who assumed duty on 16th January and was in charge of the Eastern Circle at the end of the year.

I have the honour to be,

SIR,

Your obedient servant,

KENNETH BURBRIDGE,
Conservator of Forests.

PART VII.

TO THE HONOURABLE THE COMMISSIONER OF LANDS AND FORESTS.

SIR,

I have the honour to submit the report of the Division of Inspection for the year 1926.

2. The staff of the division now consists of the Inspector of Plants and Produce, Mr. G. Tuach, and four Sub-Inspectors, Messrs. S. T. Maddy, L. Inga, I. W. Jones and S. Margai. The last two named are new appointments and completed their course of instruction in October.

3. The inspector was in charge of the division throughout the year. He also did duty with the Police as an inspector during the railway strike.

TOURS OF INSPECTION.

4. From the 11th February to the 6th April the inspector was engaged on the inspection of peeled ginger at Moyamba. During May and June he was engaged collecting and preparing for the despatch of exhibits to the Canadian National Exhibition. In July he made a tour of inspection along the Branch Line to Makeni and also in the Port Loko District. During August and September he toured the Southern Province and in October and the first ten days of November he toured the Central Province. In December he was engaged on propaganda in connexion with the preparation of ginger in the ginger areas of the Central Province.

ACTIVITIES OF SUB-INSPECTORS.

5. Sub-Inspector Maddy was in charge of the Freetown area throughout the year. His duties consisted of examination of produce arriving at Freetown from the rivers and the railway line, with periodical visits to merchants' stores and export sheds. He reported seventeen persons for offences against the Produce Ordinance, fifteen of whom were convicted with fines amounting to £41 10s. 0d.

6. Sub-Inspector Inga was in charge of inspection in the Southern Province with headquarters at Bonthe. He toured in each district of the province alternately during the dry season. During the wet season he was principally engaged at Bonthe and York Island, inspecting produce about to be exported. He obtained convictions against several merchants for attempting to export palm kernels which were not of the standard prescribed by the Ordinance. The kernels in question, which amounted to well over 600 tons, having to be cleaned before they could be passed for export. He obtained in all fifty-one convictions for offences against the Regulations with fines amounting to a total sum of £109 13s. 6d.

7. Sub-Inspector I. W. Jones and S. Margai completed their course of instructions at the end of October and were posted respectively to Blama and Pendembu where they remained up to the end of the year, their duties being to examine all palm kernels offered for sale to merchants and to make occasional visits to outlying stations. Blama and Pendembu are the two principal buying centres on the railway, and merchants complained that they were being fined in Freetown for produce railed from these and other stations on the railway. They pointed out that practically all the produce bought by them at these stations was purchased from middlemen in large quantities at a time and that it was impossible for their agents to examine it all thoroughly before purchasing. It was therefore decided to post one of the new sub-inspectors to each of the two principal buying centres, and the results have fully justified this decision. The palm kernels now arriving from these stations are of exceptionally fine quality.

8. Ten traders were reported for offering adulterated produce for sale in November, but the cases were not disposed of before the end of the year. There are also two cases of attempted bribery pending against Syrian traders.

9. The following is a return showing the number of persons reported by the division and the fines imposed during the year for offences against the Native Produce Regulations :—

Number of persons reported	...	...	...	...	...	108
Number convicted	...	...	...	...	...	82
Number discharged	...	...	...	...	...	12
Number not dealt with at end of year	...	...	...	...	...	14
Total amount of fines	...	...	...	...	£194 18s. 6d.	

WEIGHTS AND MEASURES.

10. The necessary standard weights were issued to the division in November and by the end of the year 100 certificates of justness were issued. Two convictions were obtained against traders for offences against this Ordinance with fines amounting to £6.

REVENUE AND EXPENDITURE.

11. The following is a statement showing the revenue and expenditure for the years 1925 and 1926:—

(a) Revenue.												
1925.				1926.			Increase.			Decrease.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Produce licences	1,418	19	4	1,460	2	6	41	3	2	—		
Fines	243	7	6	200	19	6	—			32	8	0
				£1,661	2	0	£41	3	2	£32	8	0

(b) Expenditure.												
							£	s.	d.	£	s.	d.
Personal Emoluments	...	...	...	...	...	...	672	16	11			
Other Charges	...	...	...	...	...	...	310	9	5			
							£983	6	4			
Revenue	...	...	...	...	...	...				1,661	2	0
Expenditure	...	...	...	...	...	...				983	6	4
Excess of revenue over expenditure										£677	15	8

PRODUCE INSPECTION.

12. During the year the revised produce laws came into operation. They include the Native Produce (Standardization and Grading) Ordinance and an Ordinance for the Compulsory Protection of Water-borne Produce. The application of these ordinances have reacted most favourably on the quality of the produce, particularly with regard to the latter, in the Bonthe area where all the produce is water-borne. It is now compulsory to have floor boards or decking in every boat used for the conveyance of produce, with suitable coverings in the event of wet weather. This section of the Ordinance has been rigidly enforced with the result that produce is now delivered in a much drier condition than in the past. The percentage of impurities allowed in produce has been reduced from five to four per cent. and this also has had the desired effect.

The reports received from England on shipments of palm kernels have been most satisfactory. In many cases premiums were paid which shows that the oil contents must have been higher than the basis of 49 per cent. It is on that basis that kernels are purchased in England. It is also satisfactory to note that Sierra Leone kernels are now accepted on the Continent on the same basis as Nigerian's. In previous years Sierra Leone kernels were looked upon with disfavour by continental crushers. The latest reports from Hamburg crushing mills have been most satisfactory.

EXPORT OF PALM KERNELS.

13. Another record has been made in the exports of palm kernels—65,000 tons being exported, an increase over 1925 of 1,769 tons. It also represents an increase of 24,591 tons over the exports for 1921, or an average yearly increase of practically 5,000 tons. The value of the kernels was rather less than in 1925, the difference being about 15s. per ton. This was no doubt due to the industrial unrest in England.

14. There have been many opinions expressed as to the cause of the increase in production. There can be no doubt, however, that the improvements of roads in the Protectorate during the last five years is to no small extent responsible. The bridging of roads has made motor transport possible. Buying centres have been opened up along these roads and producers can now sell their produce within a mile or two of their homes instead of having to undertake a journey of several days to the railway. The time thus saved enables them to collect more produce.

15. The following figures show the total exports of palm kernels from Freetown and Sherbro during the year :—

FREETOWN.		SHERBRO.		TOTAL
WEIGHT, Tons.	VALUE. £	WEIGHT, Tons.	VALUE. £	Tons.
49,002	852,849	15,998	263,931	65,000

The exports for the preceding five years were as follows :—

1921, Tons.	1922, Tons.	1923, Tons.	1924, Tons.	1925, Tons.
40,409	49,029	59,545	61,117	63,231

PALM OIL.

16. This produce was brought under inspection during the year, but as the appliances for testing did not arrive until late in the year little could be done in this connexion. Tests were however carried out in the Southern Province and the sub-inspectors instructed in the method of testing. No case of adulteration was reported during the year. A complaint was, however, received from Liverpool on the high percentage of "Free Fatty Acid" in one consignment.

There was a decrease of 123 tons in the quantity of oil exported as compared with 1925. Prices, however, compared favourably, the value per ton being about £31.

GINGER.

17. An effort was made in February to induce growers in the Moyamba District to peel their ginger more thoroughly than they ordinarily do. It was hoped that it would be possible to obtain 100 tons Grade "A" ginger to form a trial shipment to England to test the market for this quality. The prices offered by the Chamber of Commerce for peeled ginger was not a sufficient inducement to the grower. The railway strike also interfered considerably with the arrangements. As a result only 14½ tons of Grade "A" ginger was purchased.

It is gratifying to note however that, although the quantity of Grade "A" obtained was disappointing, our propaganda was successful, inasmuch as it was the means of improving the appearance of a considerable portion of the crop.

From the point of view of quantity the season was a record, no less than 55,265 cwt. being exported, an increase over 1925 of 6,417 cwt. Unfortunately, however, this quantity was very much greater than the market could consume, with the result that a large portion is still on the market unsold.

18. The following is a statement showing the exports of ginger for 1926 and the three preceding years :—

	Weight, Cwt.	Value, £
1923	27,718	45,974
1924	38,847	105,633
1925	48,848	119,002
1926	55,268	72,019

As will be seen from the foregoing, there was a very considerable drop in the price paid for ginger this year as compared with the previous years. It is also obvious that there is only a limited demand for Sierra Leone rough-scraped ginger.

PIASSAVA.

19. This produce still occupies an unfavourable position on the European market. There was a decrease in value of this year's production as compared with 1925 of over £3,000, although there was an increase in exports of 55 tons.

Our total exports for this year was 2,083 tons of which 1,473 were shipped to Germany, 372 to the United Kingdom, 190 to America, and the remainder to South Africa, Holland and Belgium.

It would appear from this that Germany was our biggest customer, but it does not necessarily follow that the whole of that quantity was consumed in Germany. The option on bills of lading may have been exercised by the shippers and consignments disposed of at any port other than Hamburg where the market may have been more favourable.

It is hoped that in the near future a standard of quality will be laid down for this product. At present it is difficult to know what exactly is required for the European market.

I have the honour to be,

SIR,

Your obedient servant,

GEO. TUACH,

Inspector of Plants and Produce.

FREETOWN,

8th March, 1927.
